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MANCHURIA STUCK ON THE WAYS.

The New York Ship Building Co., Camden, N. J., endeavored to launch the Pacific Mail steamship Manchuria on Saturday last but failed to do so. It is supposed that the tallow hardened on the ways. At any rate nothing could budge the steamer, even though 150-ton rams thumped her and eight 65-ton hydraulic jacks tried to ease her on the ways. Cranes suspended over the vessel ran back and forth to create vibration and tugs strained at the cables, but the Manchuria would not move. Of course there was great disappointment on account of special preparations that had been made for the launch. On Monday, with conditions more favorable, the vessel was started and went into the water without injury.

The Manchuria is a sister ship of the Mongolia, which was launched on July 25 last. She is 625 ft. over all, 65 ft. beam and 51 ft. deep with a displacement of 26,530 tons, and a dead weight carrying capacity of 14,000 tons. She is designed for a speed of about 16 knots upon an indicated horse power of 12,000. The Manchuria, like her sister ship the Mongolia, is a four-deck vessel with a complete shelter deck and large bridge house amidships. She is rigged as a four-masted schooner and is equipped with powerful cargo gear for the rapid handling of freight. She is provided with a cellular double bottom and deep tanks for ballasting. Accommodations are provided for 350 first-class passengers, sixty-eight second-class passengers and about 1,300 steerage passengers with a crew of 216 men. The captain and officers have commodious quarters in the bridge house amidships, executive officers being located in the forward end of the house and the engineers in the after end. The captain's cabin is on the bridge deck, immediately abaft the chart room, and within easy reach of the bridge. The petty officers and crew are berthed forward on the upper deck. A complete hospital is one of the features of the vessel

The Manchuria is propelled by triple-expansion engines, designed for eighty revolutions per minute, and supplied with steam from four double-ended and four single-ended Scotch boilers, fitted with Morison corrugated furnaces. The vessel will be lighted throughout by electricity and as she is intended for oriental trade her system of ventilation will be most elaborate. Both the Manchuria and Mongolia were originally laid down for the Atlantic Transport Line, but were bought by the Pacific Mail Steamship Co. while they were still on the stocks. The original plans were considerably altered in order that the vessels might be adapted for the trade between the Pacific coast and China and Japan.

NORWEGIAN MERCHANT NAVY.

According to statistics compiled by the Norsk Veritas the additions to the mercantile marine of Norway last year, consisted of thirty-five sailing vessels (eleven of wood and two of iron) purchased abroad at second-hand, and twenty-two of steel built in home yards, with an aggregate carrying capacity of 26,328 tons, as well as eighty-three steamers (nine of wood, twelve of iron and sixty-two of steel), with a total capacity of 92,027 tons. Of these eighty-three steamers, three of wood and thirty-eight of steel were built in Norway and fifteen of steel were built abroad, while the remaining twenty-seven were second-hand purchases. Against these additions to the fleet are to be placed the disappearance in the course of the year of 132 sailers (116 of wood, fifteen of iron and one of steel) measuring altogether 76,459 tons, and thirty-five steamers of, in the aggregate, 28,003 tons, forming a total of 167 vessels and 104,462 tons. Of these 167 vessels which were taken off the register, eighty-eight sailing ships and twenty-two steamers were lost, thirty-eight sailers and twelve steamers were sold to foreigners, and six wooden sailers and one iron steamer were broken up. The result was a net decrease of ninety-seven sailing vessels measuring 49,636 tons, and a net increase of forty-eight steamers of 64,024 tons; so that although the Norwegian merchant navy was smaller in number at the end of last year by forty-nine vessels it was greater in carrying capacity by 14,388 tons. As regards ship building in Norway eighty-six new vessels were completed last year with a total measurement of 40,043 tons; forty-three of them were, however, of less than 100 tons.

Andrew Carnegie returned from Skibo this week. Speaking of the financial situation he said: "This denouement will result in a salutory reduction of values and a healthy condition after the water has been squeezed out of some properties. It is a good thing to squeeze water out of all properties. The standard securities, and I include Steel among them, are as safe as ever. This is my eightieth trip across the ocean. No more fast ships for me. I want a boat like the Cedric, steady and sure, and no vibration." Speaking of Mr. Schwab he said that it was human nature to kick a man when he is down.

REAR ADMIRAL CAPPS ASSUMES CHARGE.

Rear-Admiral Washington L. Capps, the newly appointed chief constructor of the navy, who succeeds Rear-Admiral Francis T. Bowles, assumed the duties of his office at the navy department this week. When the resignation of Admiral Bowles was announced it created great surprise in naval circles, for it was known that he had received and declined several offers from private corporations during the past few years, one of which, it is stated, was that of president of the New York Ship Building Co. at Camden, N. J. He felt that he would not be justified in resigning, and until the offer came to him from the Fore River Ship & Engine Co. to become its president, at a salary, it is reported, of $50,000 a year, he refused seriously to consider any of them. His salary as chief constructor of the navy was $5,500 per annum. Naval Constructor Henry G. Smith, first assistant in the bureau, has also resigned to become assistant to his former chief at the Fore River works.

These two resignations make four vacancies in the construction corps to be filled by selection from naval academy graduates who must, however, after graduation take a special course of study in construction with a view to becoming active naval constructors, but they will not be available for regular service for several months yet. The law of the previous congress provided that the construction corps should be increased to seventy-five, the number in July last being forty-six, and that the additional officers should be secured by appointing five to the corps in each year, but the chief constructor was unable to get any assignments to the corps this year. One of the last official acts of Admiral Bowles was to send a petition to the president urging the necessity of making assignments to the corps, and giving to those assigned an opportunity to perfect themselves in the duties to be required of them. Within two years there have been three other resignations from the construction corps to accept with private firms offers of places with much higher salaries than they navy pays. These officers were Frank W. Hibbs, Lawrence Spear and Daniel H. Cox. The extraordinary professional training which a naval officer undergoes makes him especially desirable to a private institution.

Chief Constructor Capps is an officer of recognized ability, having been the superintending constructor at the head of numerous and responsible projects of naval construction, especially at the New York navy yard, where he was on duty for several years. It will be recalled by many who followed the events of the Spanish-American war that he commended himself to the navy department and to the president by the manner in which he discharged the duties entrusted to him on the Asiatic station, especially in raising the Spanish war-ships, for it was he who received the credit for that work in official Washington circles, and not Constructor Hobson. He was on duty at the bureau in Washington for a long time under Chief Constructor Hichborn, and his selection for chief of the bureau was strongly recommended by Admiral Bowles. He will not be forty years old for three months yet, and he is, consequently, the youngest officer who ever held the position of chief of bureau.

REAR ADMIRAL ENDICOTT'S ANNUAL REPORT.

Rear Admiral Endicott, chief of the bureau of yards and docks, in his annual report to the secretary of the navy, says that several of the yards, especially those at New York and Norfolk, are becoming congested, owing to their limited area, and unless some action is taken looking to their relief their efficiency will become restricted. The estimates for the coming fiscal year, it is explained, provide for continuing the work on dry docks at Charleston, New York and Norfolk, and the steel floating dock at Cavite, and, with the exception of the estimates for the improvement of the water front at the New York yard—$1,500,000—these are among the largest items for which estimates are submitted. Attention is called to the need of more extensive accommodations for the berthing and storing of torpedo boats, and it is suggested that the construction of small dry docks at Norfolk and other yards for the docking of the large number of small boats of the navy would be an economical provision. Many works of improvement are necessary at the Charleston yard if it is to be developed into a station of moderate efficiency, says the report, and also at New Orleans.

Admiral Endicott says that a dry dock of the largest capacity should be constructed at once at the Pensacola yard, as he believes that this yard will be of great importance in the future. He adds that a new dry dock will be required at Puget sound shortly. Estimates for the construction of two modern barracks for enlisted men, to cost $600,000 each, are made, the sum of $200,000 for each being stated as the amount required for the fiscal year.

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RECEIVER SMITH'S REPORT.

He Shows that the United States Ship Building Co. Never had the Slightest Chance to Live—Believes that Mr. Schwab Should be Made to Disgorge.

James Smith, Jr., receiver of the United States Ship Building Co., filed his report in the United States circuit court in Newark on Monday. A copy was filed informally with Judge Kirkpatrick on Saturday night last. In his report the receiver characterizes the promotion of the company and the method of its management as an "artistic swindle," declares that at all times the company was absolutely at the mercy of Charles M. Schwab, and that the "figurehead directors" parted with $67,997,000 (par) of the ship building company's stocks and bonds for the plants of the subsidiary companies, the real total value of which was only $12,441,516.26. Mr. Smith has fulfilled his prediction that he would go at the matter without gloves. He charges fraud and deliberate misrepresentation and intimates that Schwab should be compelled to surrender stocks and bonds of the company which he has not paid for. Four recommendations are made by the receiver to the court. They are:

RECEIVER'S FOUR RECOMMENDATIONS.

1. That in order to avoid depreciation by disuse, and because of the existence of controversies as to the validity of the incumbrances upon the premises, the Crescent Ship Yard be sold free and clear of all such incumbrances as soon as the work now in contemplation is completed.

2. That similar action be taken with reference to the plant of the Harlan & Hollingsworth Co., Wilmington, Del.

3. That as soon as the debts of the company shall have been ascertained suit be instituted against all persons who received the stock of this company without paying full value therefor to recover from them such an amount as shall be necessary to pay said debts in full, under section 21 of an act of the legislature of the state of New Jersey entitled an act concerning corporations, revision of 1896.

4. That suit be instituted against the Bethlehem Steel Co. to procure the appointment of a receiver and to compel the appropriation of the earnings of that company by way of dividends on the stock.

In reviewing the facts as to the figurehead directors the receiver says: "A comparison of the figures alleged to have been relied upon by the board of directors in accepting the offer of John W. Young, with the true figures ascertained from an examination of the subsidiary companies subsequent to the purchase of said plants, discloses so great a variance as to impel the belief that the figures contained in the minutes were wilfully mis-stated. It is extremely doubtful whether any report was submitted by any accountants made as of that time, as the minutes recite."

From this comparison the receiver says, the following facts appear: First, that the amount of contracts of the subsidiary companies on hand on June 30, 1902, instead of being $36,000,000, as recited in the minutes of the board of directors, was $15,394,360.26 less than the amount therein stated; second, that it would take three years to earn whatever profit was involved in these contracts, instead of eighteen months, as alleged in the minutes; third, that the profits on such contracts, instead of amounting to $5,000,000, as the minutes recite, basing the estimate upon the past earnings contained in the report, would be about $2,000,000, and fourth, that the statement that the average annual profit on work in hand and in sight of the constituent companies, exclusive of the Bethlehem Steel Co., was $2,225,000, appears to have no more substantial basis than the wildest conjecture.

EARNINGS TO BE DEVOURED BY SALARIES.

The full capacity of all the yards was only $14,000,000 worth of work a year and the average output only $12,000,000. No benefit was derived by the combination, says the receiver, from the greater economy of central management, because according to Young's terms it was provided that the United States Ship Building Co. should enter into contracts with certain persons, therein named, for upwards of five years at salaries in many instances greater than the earnings of the subsidiary company would warrant. The acceptance of this offer, therefore, with these conditions imposed, not only reduced the earnings of the subsidiary companies, but left the officers in charge thereof practically free from any interference by the board of directors of the United States Ship Building Co. for a period of five years, a fact that must necessarily have had considerable influence upon the management and earnings of the individual plants.

Relative to misrepresentation as to earnings of the Bethlehem Steel Co. the report says: "In regard to the Bethlehem Steel Co., the minutes of the board of directors, with reference to the offer of the said Young recite that an investigation of the affairs of that company discloses that it was earning at the rate of $1,800,000 a year, and that it had a working capital of over $4,000,000. For the two years preceding the adoption of the resolution in question by the directors the earnings of the Bethlehem Steel Co. for the fiscal year ending the thirtieth day of April were as follows: 1900-1901, $381,403.83; 1901-1902, $978,743.81.

COMPANIES COLLECTIVELY HAD NO WORKING CAPITAL.

The statement relative to the working capital of the constituent companies, exclusive of Bethlehem, was that they had altogether $3,278,798.48. As a matter of fact, says the receiver, these companies, taken collectively, had no working capital whatever, but were in need of immediate financial assistance. The report continues:

"From the foregoing facts, viewed not only in the light of subsequent developments, but also from the figures obtainable at the time of the incorporation of the United States Ship Building Co., it appears to have been the intention of those responsible for the statements and figures alleged to have been relied upon to mislead and deceive the investing public and the then present and future creditors of the company. In this connection, I beg to refer to the prospectus issued to the public, with a view to inducing subscriptions for the bonds of the United States Ship Building Co., under date of June 14, 1902. This prospectus seeks to invite the public to subscribe for $9,000,000 of the first-mortgage 5 per cent. sinking fund gold bonds of the United States Ship Building Co. It recites that the United States Ship Building Co. 'has been organized under the laws of the state of New Jersey.' It implies that the total capital stock of the company is $20,000,000, $10,000,000 of which is preferred and $10,000,000 common. It sets out a list of the directors of the United States Ship Building Co., numbering ten in all. It recites that the subsidiary plants of the company, exclusive of the Bethlehem Steel Co., have been appraised as going concerns at $20,000,000; that these companies would have a combined working capital of more than $5,000,000; that they have on hand contracts for work amounting to more than $36,000,000, on which the profits were estimated at over $5,000,000. Waiving for the present all discussion as to the value of the plants as going concerns, a comparison of this prospectus with the facts discloses the following false and misleading statements:

GLARING ERRORS OF THE PROSPECTUS.

"1. At the date of this prospectus the United States Ship Building Co. had not been incorporated.

"2. Its capital stock was never $20,000,000. Originally it was $3,000, which amount was subsequently increased to $45,000,000.

"3. Six of the ten persons mentioned as directors in the prospectus were not directors of the company, and never have been.

"4. The amount of contracts on hand did not exceed $36,000,000, their face value being $34,182,861.94, but of this amount a profit was available only on the uncompleted portion of the contracts, which profit, as heretofore shown, will not exceed $1,078,261.42, and will take three years to earn.

"5. These companies did not have a working capital of more than $5,000,000; the figures of the accountants show only a working capital of $3,278,798.48. This working capital, however, was almost obliterated by subsequent adjustment, as hereinbefore set forth.

"6. The statement that the profits on contract work in hand would be $5,000,000 was undeniably false. If it was claimed that the profit was estimated on the entire amount of $36,000,000, the answer to this is that, admitting there was $36,000,000 worth of contracts (which was not true), the utmost profit that could be looked for, according to the figures of the accountants, was $3,600,000. When this prospectus was issued the persons who were responsible for it must have deliberately disregarded figures which would have shown that the amount of work still to be done on the contracts was but $20,605,639.74, instead of $36,000,000, and that upon such uncompleted work a liberal estimate would have placed the earnings at only a trifle over $2,000,000.

"It may be claimed, however, that the book values give no adequate idea of the real value of the plants as going concerns, and that the earnings of the plants should be taken into account in ascertaining such value. With reference to this matter, the minutes of the directors recite that the constituent companies, exclusive of the Bethlehem Steel Co., had an earning capacity annually of $2,225,000 and that the Bethlehem Steel Co. was earning $1,800,000, making a total earning capacity of $4,025,000.

"This statement was false, and must have been known to be so at the time the plants above mentioned were taken over. The earnings of all the companies for the year ending July 31, 1903, were as follows: Constituent companies, $833,458.74; Bethlehem Steel Co. (net earnings) after deducting interest on underlying mortgages, discounts and depreciation, $1,662,530.80; total, $2,495,989.54.

"On the basis of what the United States Ship Building Co. received from all the companies last year, there would be sufficient income only to meet the interest, at 5 per cent. on an investment of a trifle over $6,000,000. It may be insisted that this is not the best the companies can do, and therefore this amount should not be taken as a guide in establishing the value of the plants. Your receiver is satisfied that it is not the best the companies can do, especially in the case of Bethlehem."

STOCK GIVEN TO SCHWAB WITHOUT CONSIDERATION.

The receiver then asks who got the "plunder" and tells how he expects to get back some of Charles M. Schwab's holdings, saying:

"Considering the value of the plants, therefore, either from the standpoint of the books or the earning capacity of the companies, and allowing for an increase in earnings in the future, it is evident that the accommodating directors of the United States Ship Building Co., in acquiring these properties, deliberately gave away many million dollars in the stock and bonds of their company. Who participated in this wholesale plunder? The testimony now being taken in the above entitled proceedings will

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doubtless disclose the names of all the participants; but as such testimony will be submitted to this court for action, your receiver does not deem it proper to comment upon it here. Certain it is that much of this vast amount of stock and bonds was taken by persons and corporations who parted with little or no consideration in exchange therefor. Blocks of the stock went to the vendors of the constituent plants and to the purchasers of bonds, as bonus, absolutely without benefit to the company; $20,000,000 of it admittedly went to Mr. Charles M. Schwab in addition to the agreed price for Bethlehem. Some of it went to the promoters of this artistic swindle; and when all had been provided for, what was left of the bonds, amounting to $1,500,000, was handed back to the company ostensibly to supply it with 'working capital.'

"From the foregoing statement as to values, it is apparent that the $24,500,000 of bonds given up by the directors was an excessive price for all the plants purchased. Your receiver is advised that as to the $44,997,000 of the preferred and common stock handed over by the directors to the vendors and promoters of this scheme, it cannot successfully be maintained that any value was paid therefor. Treating the issue of bonds, therefore, as full payment for the properties (and in so doing the ship building company alone is being injured), it follows that the vendors and promoters and their associates in the transfer and conveyance of the various plants to the United States Ship Building Co. by the acceptance of this $44,997,000 of the capital stock of the ship building company, without paying value therefor, became liable thereon to said corporation, by virtue of the provisions of section 21 of an act of the legislature of the state of New Jersey, entitled an act concerning corporations, revision of 1896. The United States Ship Building Co. was entitled to recover such indebtedness from the holders of such stock and your receiver is advised that he is entitled to enforce the same.

"Accordingly, your receiver has offset against the sum alleged to be due on the $10,000,000 mortgage to the New York Security & Trust Co. as trustee, to protect the issue of bonds to Charles M. Schwab, the liability of the said Charles M. Schwab on the $20,000,000 of stock received by him as aforesaid, and has interposed an answer in the suit by said trustee to foreclose the mortgage given as security for said bonds, claiming that by virtue of said offset the total issue of said bonds has been fully paid and satisfied."

CAUSES OF FAILURE OUTLINED.

So far as the culpability of the directors is concerned the receiver says that "they should be held responsible for their unlawful act, but that they were mere clerks and figureheads and not alone responsible." Under the head "causes of failure," the receiver accuses Schwab of precipitating the crash and overlooking the requirements of common fairness towards the ship building company which he was able at any moment to throttle. The report continues as follows:

"What were the causes of failure of the United States Ship Building Co.? One of such causes was the fact that the directors parted with bonds to an amount upon which it was impossible to meet the interest. The failure, however, was precipitated, if not directly brought about, by the fact that in the Bethlehem transaction the United States Ship Building Co. officers had to deal with people who, while thoroughly understanding the intricacies of 'higher finance,' seemed to have overlooked the requirements of common fairness.

"In speaking of plant values elsewhere in this report, the Bethlehem property has been dealt with as though it had been purchased by the United States Ship Building Co., but an examination of the transaction will show that it was otherwise. While the agreed price for the Bethlehem company was $9,000,000, to be paid for by an issue of $10,000,000 of bonds at 90, the directors of the United States Ship Building Co., upon request, handed over to Mr. Charles M. Schwab an additional amount of $20,000,000 in the common and preferred stock of the United States Ship Building Co. As this $20,000,000 of stock would not be sufficient to give Mr. Schwab the control of the United States Ship Building Co., there was inserted in the mortgage given to secure his $10,000,000 of bonds, a provision that such bonds should have a voting power equal to $10,000,000 of stock. As the total issue of stock of the United States Ship Building Co. was but $45,000,000, the $30,000,000 voting power thus given to Mr. Schwab was sufficient to justify him in saying that he did not sell the Bethlehem Steel Co., but took over the United States Ship Building Co., the directors of that company giving him $30,000,000 in stock and bonds for taking it off their hands.

"In this deal Mr. Schwab parted with nothing. In the sale of the other constituent companies, the real and personal property, as well as their capital stock, were transferred to the United States Ship Building Co. by the necessary deeds, bills of sale and assignments. But in the case of Bethlehem Mr. Schwab permitted to be given up only its capital stock, and this he did in such manner as to place it beyond the control of the ship building company. If interests friendly to the United States Ship Building Co. had controlled this stock it would have been able to reach the earnings of the Bethlehem Steel Co. through a friendly board of directors; but in the $10,000,000 mortgage, it was provided that the trustee should designate three of such directors, and the United States Ship Building Co. should designate four. As Mr. Schwab controlled the United States Ship Building Co., by reason of his aforesaid majority of stock, and as the trustee was of his own selection, the United States Ship Building Co. was absolutely at the mercy of Mr. Schwab.

DOUBLE RIVETING SCHWAB'S GRIP.

"Mr. Schwab's advisers, however, in evident fear that something had been overlooked, caused the United States Ship Building Co. to execute a contract wherein it agreed and guaranteed that so long as any part of the $10,000,000 issue of bonds above referred to should be outstanding and unpaid, the Bethlehem company should pay dividends on its entire outstanding capital stock at the rate of not less than 6 per cent. per annum, and for the purpose of making such payments the ship building company agreed that the Bethlehem company should earn, over and above its operating expenses and fixed charges; (including interest on its bonds and taxes), and over and above the working capital of $4,000,000,000 therein provided for, a sum sufficient to make such annual dividend disbursements; and, in the event of the failure of the Bethlehem company earning sufficient to pay such dividend at the rate of 6 per cent., then the United States Ship Building Co. was to pay to the Bethlehem company, on demand, a sum sufficient to make such annual dividend disbursements. The ship building company further agreed to supply the Bethlehem company with all such orders, contracts, work and earning capacity as should be necessary to enable it to earn and pay the annual dividends above mentioned.

"Was ever such another agreement, so apparently harmless, yet so ruinous, conceived by the mind of man? On its face it was simply an agreement to the effect that if sufficient earnings were not made by the Bethlehem to pay a dividend of 6 per cent. on its capital stock, the United States Ship Building Co. would advance such sum. This agreement was an absurd arrangement, in view of the fact that the United States Ship Building Co. was the nominal owner of this stock, and as such was entitled to its dividends; nevertheless the United States Ship Building Co. was made to agree in effect that if it wanted dividends from Bethlehem it should contribute the means to enable the payment of such dividends. An excuse for the United States Ship Building Co. officials entering into such an agreement might be found in the supposition that they may have believed that as they had the right to designate four of the seven directors of the Bethlehem Steel Co., they would be able to control the earnings of that company and the agreement above mentioned might become inoperative. Such a belief, however, had no substantial foundation, for, as heretofore stated, the control both of the Bethlehem and the United States Ship Building Co. was vested in Mr. Schwab. Your receiver will not attempt to advance any reason why the latter thought it necessary to take any such agreement in view of the fact that he had previously thereto obtained control of the ship building company that would enable him at any moment to throttle it.

"As if the foregoing provisions in said agreement were not sufficient, the United States Ship Building Co. was further made to agree that in the event that the working capital of the Bethlehem Steel Co. should at any time fall below $4,000,000, the United States Ship Building Co. would, upon demand, make up such sum as might be necessary to bring the working capital up to that figure. The agreement contains other provisions, all operating against the United States Ship Building Co., but enough has been referred to to show that in signing it the United States Ship Building Co. had lost all chance of ever reaching the earnings of the Bethlehem Steel Co.; for, assuming that Mr. Schwab's directors of the United States Ship Building Co. should demand of Mr. Schwab's directors of the Bethlehem Steel Co. that a dividend be declared from the earnings of the latter company, Mr. Schwab's directors of the Bethlehem Steel Co. could always reply (as they did when demand was made) that it was not considered wise to declare a dividend at that time."

Information from the state department is to the effect that contract for a part of the port works of Rio, Brazil, has been let, without public bidding, to the firm of C. H. Walker & Son of London as was expected. This firm built the port works at Buenos Ayres and has performed other notable engineering works. The estimated cost of the docks and the dredging, the particular work to be performed by Walker and Son, is $21,500,000. It is planned, however, to spend on various works in connection with the port and the improvement of the commercial facilities of the city, such as canalization, widening of streets leading to the docks, disappropriation of private property, and in taking over conflicting concessions, $42,000,000. The work will all be done and the money for the purposes mentioned above expended under a port commission of Brazilian engineers, already appointed. It is expected the first machinery and material will arrive here in December and that the work will be well under way by March next.

The naval board on construction has recommendeed to the secretary of the navy that the boilers of the Niclausse type in the battleships Virginia and Georgia and the armored cruisers Pennsylvania and Colorado, now under construction, be retained in those vessels. This action of the board is a direct result of the recent test runs of the battleship Maine from Newport News to Celebra island, West Indies, and return. During this run the Maine maintained an average speed of more than 15 knots.

The protected cruiser Tacoma was given a trial at San Francisco last week and exceeded the contract speed of 16½ knots. The Union Iron Works, builders, are delighted with the result.

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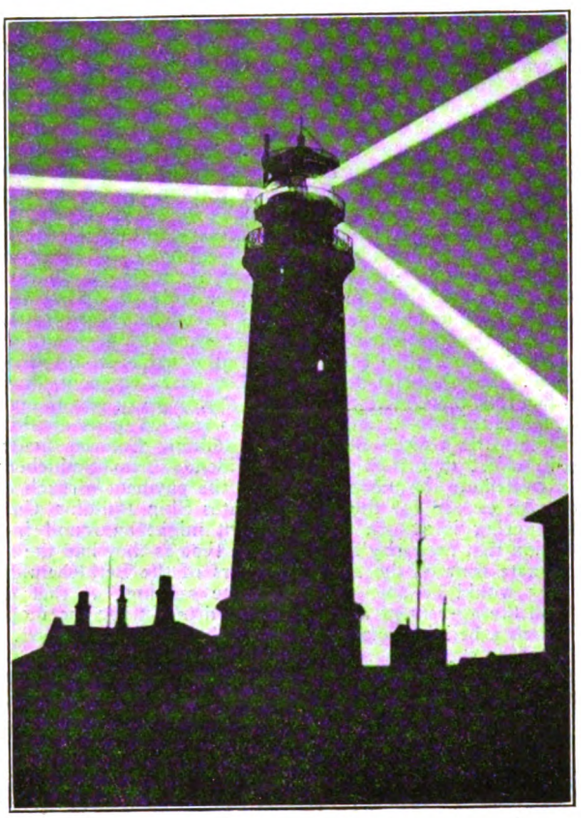
ELECTRIC FLASH LIGHT AT HELIGOLAND.

The lighthouse tower at Heligoland has now a new form of electric flashlight, installed by the Siemens-Schuckertwerke of Nuremberg, Germany. There are three lower searchlights, arranged 120° apart, and another mounted on top, all operated automatically and driven by electric motors. The carbons, which are fed by automatic mechanism, are placed in a horizontal position as is usual with most large searchlights. The intensity of the light is 30,000,000 candle power as a minimum and the maximum current used is 100 amperes. The light flashes occur every five seconds and they remain in one position only a tenth of a second.



Searchlights of 30,000,000 Candle Power.

The three searchlights mounted on the lower revolving platform 120° apart have mirrors 29 in. in diameter and utilize a direct current of 24 amperes each, the platform revolving at the rate of four revolutions per minute. The electrical apparatus was constructed by the Elektricuats-Actiengesellschaft, formerly Schuckert & Co., Nuremberg. The current is supplied to the tower lights by a lead iron-armored covered cable connected with the power station. The power plant consists of two steam engines directly connected to dynamos of 216 amperes capacity at a pressure of 75 volts.

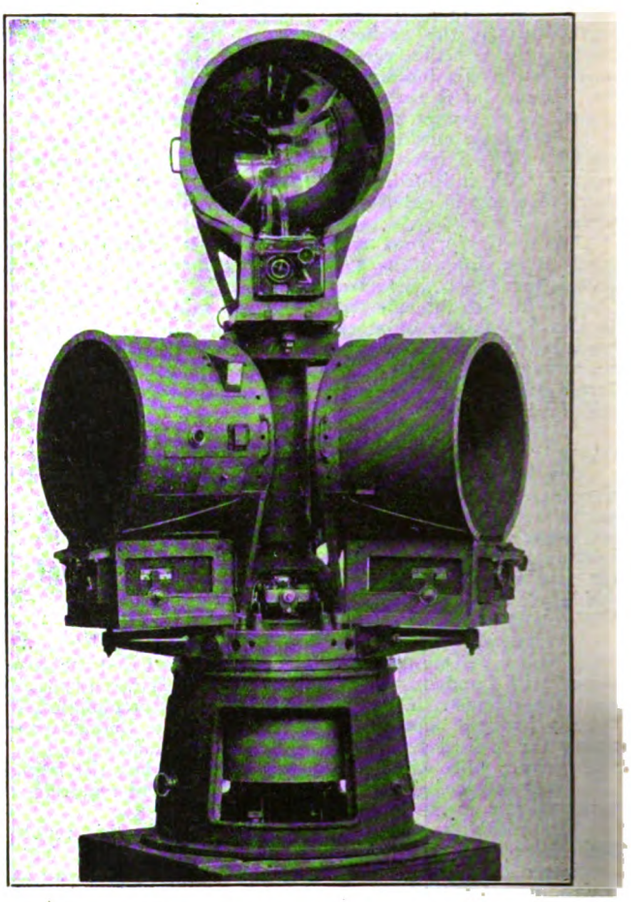
This new beacon supersedes the old petroleum light at the mouth of the River Elbe. It is probably the most powerful searchlight now in operation. It is also distinguished by the fact that a return has been made to the old form of parabolic mirror, with a powerful light in the focus, instead of the usual Fresnel lenses and prisms. The mirrors of the Heligoland light consist each of a piece of silvered glass. No protection against weather is provided in front of the light. The duration of one-tenth of a second for the flash, a characteristic of most French beacon lights, is here adopted for the first time in Germany. Notwithstanding the briefness of this exposure it is stated that on the first night of trial the light was seen at a distance of 40 miles.

SECRETARY SHAW ON SHIPPING.

Secretary Shaw of the treasury department in discussing during a speech in Boston recently the need of aid to shipping made a very pointed argument in the following words:

"While the importance of foreign markets is apparent to all, it is more important still that we do not lose sight of the value of our own markets. I submit that it would be unwise for us to adopt the Democratic contention and surrender what we now have, in the hope of getting a larger share of what we do not now have. Giving away what is ours will not secure for us what we do not now possess. England has proceeded upon the Democratic theory for many, many years. She has given us free access to her markets, and we annually sell to Great Britain $600,000,000. We have protected our markets, and Great Britain annually sells to us about $155,000,000. Our policy of protecting our markets, and thus keeping them for ourselves, has resulted in a balance of trade in our favor of $500,000,000 a year. The policy pursued by Great Britain and advocated by the Democratic party has resulted in a balance of trade against her of $1,000,000,000 a year. Our Democratic friends during all these years have urged us to try the English policy of a tariff for revenue only. We have tried it a few times, and the result has been practically the same every time. But, conceding the importance of more markets, my belief is that there is open to us a yet more excellent way to secure them. We are securing only 10 per cent. of the trade of South America, of South Africa and of the countries washed by the Pacific ocean. This trade is worth more than $1,000,000,000 per annum. We get 10 per cent. of it. Other countries secure the balance. Why? They are ready to pay the price. They avail themselves of every natural advantage and pay the price of others. They have, and we do not have, direct and regular steamship communication with these countries. We created the commerce of the interior and of the Pacific slope by means of subsidized railroads. We now subsidize rivers and harbors, in the hope of aiding commerce.

"Last winter a bill was introduced offering a subsidy for American ships, but it was defeated. I am not mourning its defeat. I was not satisfied with its provisions. But I had the experts of the treasury department figure it out, and it would have cost this nation not to exceed $1,000,000 a year, unless some of her citizens had employed American labor, in American ship yards, and constructed ships from American raw materials taken from



Reflectors at Heligoland Lighthouse.

American mines and American forests. Then, had ships enough been constructed, it might have cost us $9,000,000 per annum. But the bill provided that there never should be expended more than $9,000,000 in any one year. We annually pay $200,000,000 to foreign subsidized ships to get our foreign commerce carried.

"Senator Hanna told me there were three companies ready, if the bill was passed, to make contracts to build the ships and establish and maintain regular lines in three directions where we now have no ships. But practically every Democrat voted against it, not because of its provisions, but on principle. I recognize that the term 'subsidy' has a bogie sound. It is a good scare word. But it ought to take something more than scare words to deter us from every reasonable effort to get our share of the trade of the countries I have referred to. All Europe is establishing commercial colonies, warehouses, branch offices and banks on many of these shores. No man can now say how soon complications may arise similar to those that recently existed in Venezuela, and no one can now predict to what extent and in what manner the United States may become interested in the result of these complications. It is my judgment that we should use all reasonable means to be early on the ground.

Rear Admiral French E. Chadwick will be relievd from duty as president of the naval war college on Nov. 15 and given special duty, probably as a member of the general board for a month. He will be succeeded as president of the war college by Capt. Charles S. Sperry, now on duty at the war college. It is the intention of the navy department to give Admiral Chadwick a chance to fly his flag in command of a squadron at the first available opportunity.

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SCOTCH SHIPPING LETTER.

Glasgow, Oct. 26.—There is a pause in the demand for new ships and very few contracts have been booked this month so far. There is, however, a good deal of repair work going on at many of the yards which gives a fair amount of employment. Indeed, at some of our yards there is now nothing but repair work doing, although at others there is enough new work under construction to last over the winter. Among orders being negotiated are two merchant steamers to be fitted with turbine engines, not by the Parsons Co., but by Richardsons, Westgarth & Co., Ltd., Hartlepool, who are putting up new works for the construction of turbine machinery. The turbine engine for the new Allan liner is being made by the Parsons Co., and will be sent across to Belfast where the hull is being built.

With a decline in pig iron warrants and a slackening in the prices of makers' iron one might have looked for better prospects of cheaper ship building material. But, as a matter of fact, makers of steel ship plates are talking of combining to fix a minimum price. If they do they will open the door for American steel. Meanwhile the price of steel ship plates here is about £5 15s. per ton, less 5 per cent., and in the north of England £5 12s. 6d., less 2½ per cent. The growing depression in the engineering industry has caused the machinists in the marine engine shops here, and in the north of England, to decide not to renew their demand just now for an advance in wages.

One or two of our ship builders are hopeful of an order from the St. John (N. B.) board of works who have invited tenders for the construction of a steel two-propeller ferryboat, 140 ft. in length, for service in the harbor there. Particular interest is felt in Glasgow (the birthplace of the Allan Line) in the movement which is taking place in Halifax, N. S., for a direct mail service between that port and Great Britain. Bristol is the port named as the terminus on this side.

It is stated that the sailing ships of the Leyland Line running under the French bounty system obtain a bounty of £5,000 each year on a voyage to San Francisco and back, entirely independent of freights. This, if true, is a fact of peculiar interest in view of Mr. Leyland's endeavor to persuade British sailing ship owners to lay up all unchartered vessels until freights improve.

The steamship Pontiac, built by Napier & Miller, Ltd., Yoker, for J. W. Carmichael & Co., Ltd., Nova Scotia, has run her trial trip, when a mean of 11½ knots was obtained on the measured mile. She is 352 ft. by 48 ft. 3 in. by 25 ft., and is of Lloyd's shelter-deck class, with large cubic capacity for cotton goods and a dead weight carrying capacity of about 5,500 tons. She is fitted with a deep tank, electric light, fire extinguishing pipes, steam windlass and steering gear, and Lord Kelvin's compass, and is altogether a very superior type of cargo vessel. Machinery has been supplied by Dunsmuir & Jackson, the engines are 25½, 42 and 68 in. by 45 in. stroke, with two large boilers. The vessel left immediately after the trial trip for Galveston.

The status of the naval engineer on board ship has been the subject of much discussion and consideration, but it would appear from an order issued to the British war ships in commission that no readjustment has been attained, for the former conditions relative to the distribution of power are continued. It was thought that the electric generating machinery in the engine room might be placed under the charge of the engineer along with all other machinery in the engine and boiler rooms, although the electric motors for gun and torpedo work might be left in charge of the officers using them. But the torpedo lieutenant is now to be responsible for everything electrical. The dynamo and its engine are excluded from the engineer's care, yet should the torpedo or gunnery lieutenant use a steam, oil, or gas engine for his special operations the engine will be under the charge of the engineer. Hydraulic gear associated with guns and torpedoes will be under the gunnery or torpedo officers. The engineer may be called in by the captain to report upon any mechanism on board, and is the mechanical expert of the ship; but the torpedo lieutenant may also be asked to inspect and report upon any of the electrical fittings and machinery of the ship. Heavy repairs in all cases must be carried out by the engineer to the instructions of the torpedo or gunnery lieutenant where mechanical appliances are involved.

The Famous Lighthouse at Heligoland.

The boiler committee of the admiralty has begun a long-distance endurance test of the Babcock & Wilcox boilers in the second-class cruiser Hermes. After this test the Medusa and Medes, third-class cruisers, will be required to steam at their best sea speed as long as the coal in their bunkers will last, with a view of testing the endurance of the Yarrow and Durr water-tube boilers. The committee examined the engineers to ascertain how these vessels behaved during the maneuvers, and favorable reports were made in both cases, although more in favor of the Yarrow type. The committee is consulted generally by the admiralty on the boiler details of design in new ships, and there is general agreement between the engineering staff at the admiralty and the committee on most points. The Belleville boiler in existing ships continues to do well. The committee will record for the use of the department the results of the trials still in progress and thereafter may be retained as a consultative body.

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NEWS OF THE GREAT LAKES

IRON ORE SHIPMENT—FREIGHT SITUATION.

Iron ore shipments to Nov. 1, 1903, are 22,375,000 tons (estimated) as against 24,020,036 tons for 1902. The figures are estimated because the shipments of one of the docks is missing, though they are close enough to be called the exact total. The shipments during November, 1903, were 3,000,000 tons (estimated) as against 3,311,426 tons for 1902, a decrease of 311,426 tons. The falling off in shipments to Nov. 1 of this year as compared with the corresponding period for last year is 1,645,036 tons. A total of 2,625,000 tons of ore will have to be brought down during the balance of the season in order to bring the shipments up to the 25,000,000-mark. This, of course, is not now expected. The Pittsburg Steamship Co. (Steel Corporation) has been laying up its barges for three weeks past and has been putting its steamers in ordinary during the past week. Moreover it has announced its determination to close its shipping season on Nov. 15, and as other shippers are having ore that should have been moved this month carried over until next season the movement during November is expected to be exceedingly light. It will require more than half the movement of October to bring the shipments up to 24,000,000 tons. The port of Conneaut was forced to go out of the ore receiving business a little before its time. A bar, caused by new construction work, formed across the mouth of the channel and it was found impossible to get dredges to remove it, all of them being engaged in pressing work of their own. Conneaut is the Steel Corporation's receiving port and it is not an easy matter to shift the vessels to other ports owing to their crowded condition.

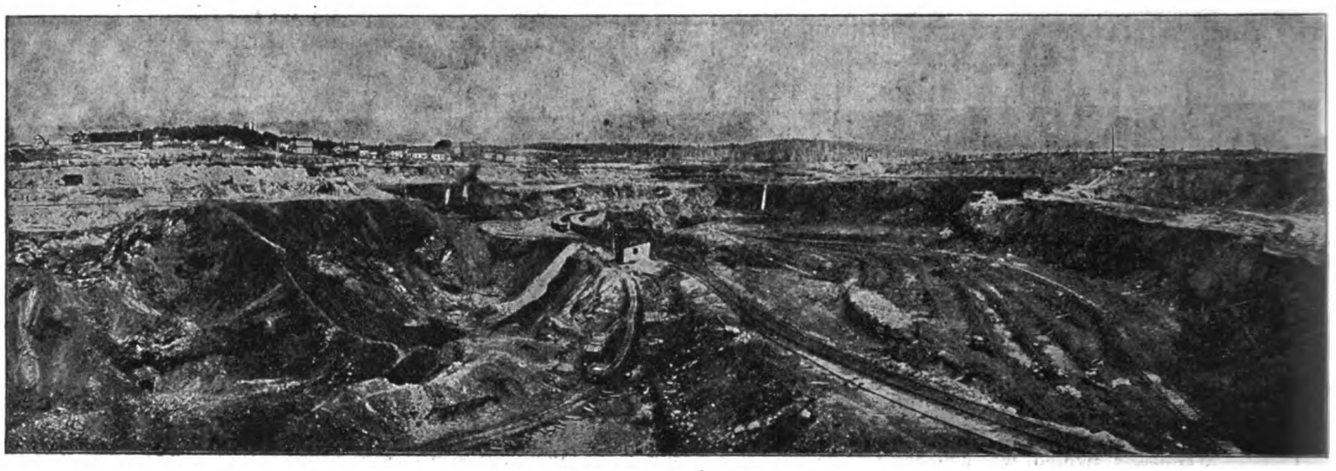
The general conditions in lake trade are unchanged, there being more vessels than cargoes in all lines save lumber. In the lumber trade tonnage is in good demand and $3 is freely paid from the head of Lake Superior to Buffalo.

Duluth, Mesabi & Northern road. All the forty-one barges and about half the seventy-two steamships will be laid by as fast as they arrive at Duluth. The others will run a week or two into November.

Copper mines of the lake region are shipping metal as fast as possible to clean up before the close of navigation. There is some $8 per ton difference in freight between lake and rail and all rail, and this will be taken advantage of by cleaning off docks and smelters as completely as possible. There is very little surplus copper and probably none unsold. Mining companies are pushing stamp mill operations as fast as possible. So far only one wage reduction has occurred, at the Trimountain mine, south of Houghton, where the miners are cut from $60 to $54 a month.

Reductions in working force are taking place at the Ely mines of the United States Steel Corporation, though not at the Chandler of the Chicago & Minnesota Ore Co., of which the Steel Corporation owns about 50 per cent. These reductions will be small and temporary.

The 150,000-ton stock pile of the Soudan hard ore mine of the Steel Corporation is being shipped and will probably be entirely moved this fall.



View of Fayal Mine, Mesabi Range.

DULUTH NEWS NOTES.

Duluth, Nov. 4.—Wheat freights from this point to Buffalo are unchanged at 1¾ cents, but inactive. A few cargoes to Montreal at 5½ cents were taken this week. Receipts of all grains at the head of the lakes for the past week were 3,700,000 bu. and shipments 2,190,000 bu., this latter including mill withdrawals of wheat for local consumption. There are now in store here 8,325,000 bu. of all grains, of which 3,778,000 bu. are flax. Much of this is sure to stay over the winter, but most of the wheat and barley, aggregating 3,850,000 bu., will move forward this month.

Minnesota ore shipments for the month of October were 1,836,000 tons, or 53,000 tons under the same month last year. To Nov. 1 shipments have exceeded last year by 210,000 tons and now reach 13,855,000 tons. The Duluth, Mesabi & Northern will move about 400,000 tons more, the Duluth & Iron Range about 200,000 tons, and the Great Northern about 270,000, making the total movement from the state for the year 14,730,000 gross tons, or 700,000 tons under 1902, when the state shipped 15,427,103 gross tons. This is a remarkably good record, all hindrances considered.

Vessels of the United States Steel fleet are being laid up at Duluth, some at the ship yard of the Superior Ship Building Co., as in need of winter overhaul, and others at the docks of the

AROUND THE GREAT LAKES.

The ship canal between Montreal and Sorel is now lighted by electricity, making it equally navigable by night as well as by day.

The Chicago plant of the Manitowoc Dry Dock Co. has been sold to Theodore Knudson and hereafter the company will operate its Manitowoc yard only.

Capt. C. W. Brown, formerly of the steamers Northern King, Globe and Onoko, but who retired about six years ago, died at his home in Cleveland last week.

Samuel Hunken of Hunken Bros., well-known contractors for the building of breakwaters and other public works, was killed while driving over a railway crossing in Cleveland on Saturday last.

Free moorage for the winter fleet is offered by the Marine City Business Men's association. With sufficient depth of water for a mile and a half along the Bell river a large fleet can be accommodated.

The canal boat C. B. Zabriske, the second one of the new type being built at William Follette's yard at Tonawanda, was launched on Saturday last. The boat has been sold to the New York Borax Co. of New York.

It is announced from Buffalo that the Independent Towing Co. of that port has sold out to the Great Lakes Towing Co. and that Manager Louis Lautenslager, who is a very capable man in his line, will be given a position with the Great Lakes company.

Smoke is one of the nuisances which every industrial community has to deal with. At present the Great Lakes Towing Co. is experimenting with a smoke consuming device in Chicago known as the Summers' patent. It is to be tried on the tug J. H. Hackley.

A tug that is to be used by the government at Toledo on dredging work will be launched Saturday at the Root ship yard

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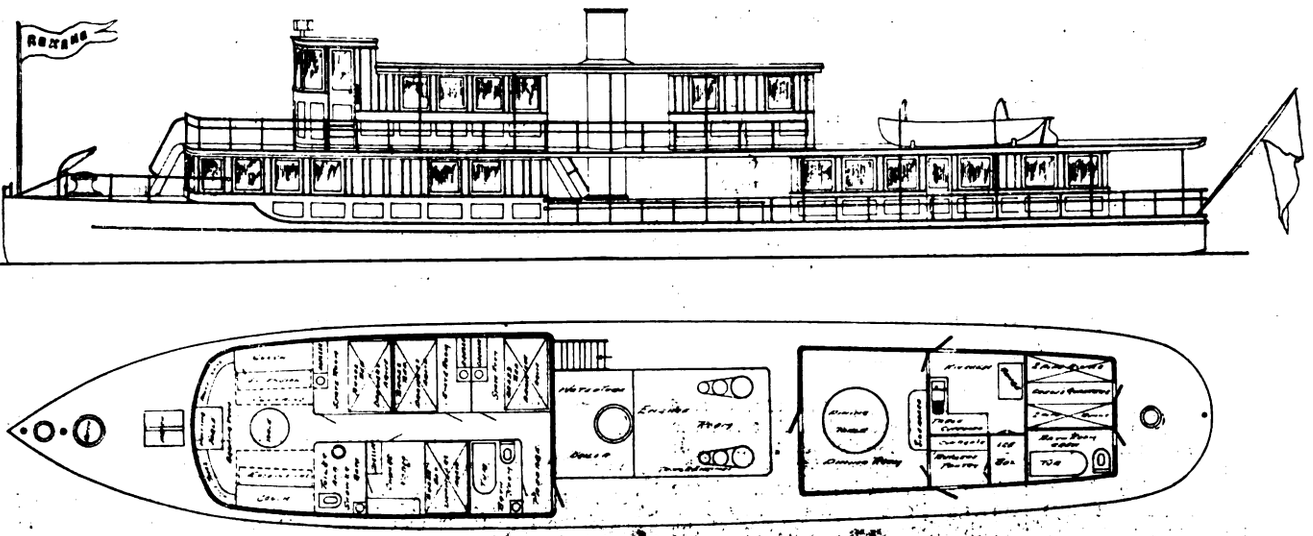
Lorain. The tug is to be named Spear. The hull will be towed to Toledo after launching and will there receive engines that were used in an old vessel also named Spear.

It is more than probable that the Cleveland & Buffalo Transit Co. will purchase the steamer Harlem, which they have been using under charter as an extra freight vessel since the large side-wheelers City of Erie and City of Buffalo were laid up a few days ago. The Harlem will be kept on the Cleveland-Buffalo run until about Dec. 1.

At a convention of shipwrights, joiners and carpenters in Detroit last week a resolution was adopted declaring for a nine-hour work day at all lake ports, with a view of reducing the number of hours to eight later on. No definite date has been selected for making the demand on the ship builders, but it is likely that the notice will be served about Jan. 1 next.

CRUISING YACHT FOR JOHN W. GATES.

The Racine Boat Mfg. Co., Racine, Wis., has just completed a trim yacht for Mr. John W. Gates of Chicago. Her dimensions are: Length over all, 100 ft.; beam, 17 ft.; loaded draught, 30 in. She is now on her way down the drainage canal, Mr. Gates intending to use her in cruising in southern waters. She weathered quite a northeaster in her trip from Racine to Chicago. The yacht is equipped with two triple-expansion engines of 200 H. P. supplied with steam from a Racine water-tube boiler. Her screws are of the turbine type, intended to prevent racing, and she is designed to develop 16 knots. She has steam capstan, is lighted throughout by electricity, has hot and cold running water, tile bath rooms and is in every way a most habitable cruiser. This is the last craft that the company will build at Racine, as it is now building a large plant at Muskegon, Mich., which it expects to occupy by Jan. 1.



Outline Drawings of Cruising Yacht Roxana, owned by John W. Gates.

[*Built by Racine Boat Mfg. Co., Racine, Wis.*

The steamer John Otis nearly foundered in Lake Michigan last week by the breaking of her machinery. When the engines went to pieces some of the steel parts were forced through the bottom of the boat, causing her to leak. The lumber cargo, which filled the hold, was the only thing that kept the vessel afloat. She drifted all the afternoon and into the evening before the tug Duncan Cady was sighted, which towed her to Muskegon. The vessel had settled so low that her deck was even with the water.

The spot off Lake View, near Chicago, where the steamer Wawatam was stranded has now been marked with a buoy by the Chicago life saving crew. The shoal spot was not, as was supposed, the foundation of the old Lake View crib, but an unmarked rock 150 to 200 ft. in length and about seven-eighths of a mile from shore. There is a depth of only 13 ft. of water over the rock. It will be blasted away. The Wawatam was released after lightering 600 tons of her cargo and towed to South Chicago. It is expected that the damage to her hull will amount to $15,000.

Complete figures as to St. Mary's Falls canal traffic in October are not as yet available but a brief summary given out by Supt. Ripley would indicate that the canal traffic for the full year will be little if any in excess of the traffic of 1902. October traffic foots up 4,475,965 tons (2,000 lbs.), of which 3,656,200 tons was eastbound and 819,765 tons westbound. Of the total 3,791,103 tons passed through the American canal and 684,862 through the Canadian. The vessel passages numbered 2,261 and the registered tonnage was 3,623,304. Eight hundred and seventeen passengers were westbound and 1,234 were going east.

At the launch in Chicago on Saturday last of the steamer Duluth, a 400-ft. steel package freighter for the Western Transit Line, champagne gave place in the christening ceremonies to appolinaris water, and in place of the usual gathering behind the sponsor of the boat there were present a hundred children from a near-by school. Little Miss Lilian Haskell, twelve years old, performed the christening ceremony for the Duluth, being the youngest sponsor ever figuring in a Chicago launching. As at other yards ot the American Ship Building Co. around the lakes, the new work under order in Chicago is very light and the ship yard force is being reduced.

The present season of navigation on the lakes has been marked with disaster to wooden vessels. The modern steel carriers have practically not suffered at all. Of course the wooden boats are old and each succeeding season finds them a little less able to weather gales. But undoubtedly a contributing cause to their undoing is the inclination to load them too deep. Wooden boats were built when the channels of the lakes were shallower than they are now. About 15 ft. was the deepest draught when most of them were built. Now a channel throughout the lakes of practically 19 ft. is a temptation to load deeper and the steady strain of added carriage has told upon the wooden craft. Their seams are likely to part when they are pounded by the waves.

CHICAGO GRAIN FREIGHTS.

Chicago, Nov. 4.—The week's shipments show a fair increase over the preceding week with rates steady at 1⅝ cent wheat, 1½ cent corn and 1¼ cent oats to Lake Erie ports and Georgian bay and with Kingston and Ogdensburg nominally 3½ cent corn. Grain receipts are favorable, averaging about 950 cars daily, and in connection with this situation as to receipts the eastern cash conditions seem to be shaping themselves for a further active outward movement by lake within the next few days. But in a general way the situation lacks the interesting features usual at this time of year and all present signs point to an early laying-up of vessels. Some further engagements of wheat (about four cargoes), Duluth to Chicago on basis of Buffalo rates, are reported, and there is some figuring also on flax at 2¼ cents, vessels to hold cargoes subject to shipper's order.

Of the shipments noted below for the week just closed, and which are compiled for the Review by P. H. Fleming & Co., there was via all rail lines some 510,000 bu. wheat, 100,000 bu. corn, 1000,000 bu. oats and 12,000 bu. rye; via lake to Buffalo and other American points, 569,000 bu. wheat, 2,190,000 bu. corn, 430,000 bu. oats and 66,000 bu. rye; and to Canada points via lake 57,000 bu. wheat and 445,000 bu. corn. The total shipments, lake and rail, were:

	This week.	Last week.	last year
Wheat, bu.	1,138,316	781,272	226,651
Corn, bu.	2,751,350	1,833,244	1,352,664
Oats, bu.	1,495,299	1,244,944	1,487,679
Rye, bu.	78,565	244,656	29,774
Total, bu.	5,463,530	4,104,116	3,096,768

	Since Jan. 1, 1903.	Same time last year.
Wheat, bu.	19,294,611	26,647,377
Corn, bu.	79,666,585	38,174,183
Oats, bu.	55,302,254	47,019,667
Rye, bu.	3,372,025	2,132,978
Total, bu.	157,635,475	113,974,205

Stocks of grain in public and private elevators are reported as follows:

	Week just closed.	Last week.	Same week last year.
Wheat, bu.	5,209,000	5,582,000	10,851,000
Corn, bu.	4,204,000	4,655,000	1,441,000
Oats, bu.	2,825,000	2,580,000	3,741,000
Rye, bu.	238,000	387,000	329,000
Total, bu.	12,476,000	13,204,000	16,362,000

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HEROISM AT THE SAUBER WRECK.

A very common error for a newspaper to make in chronicling a shipwreck is to say that as the steamer foundered her boilers exploded. A moment's thought will convince anyone of the absurdity of such a statement. The compression of air beneath the deck as the water gathers headway, results, at the supreme moment of disappearance, in the general shattering of the deck timbers, which gives the effect of an explosion. As for the boilers they could not possibly explode, for the inrush of water results in nothing more than a condensation of steam. The old story of the boilers exploding went the rounds as one of the incidents of the wreck of the Sauber. In point of fact the Sauber's propellers were racing when the steamer went down, bow foremost, which proves that her machinery was in working order and that her engineers stuck to their posts until the last minute.

The wreck of the Sauber was marked with great heroism on the part of the captain and crew of the Yale. That steamer was magnificently maneuvered to shield the sinking steamer from the elements and to keep her afloat as long as possible. The Yale stood by for five hours to windward of the sinking ship. The yawls were lowered and trailed behind for two hours before the steamer sank. Great courage appears to have been manifested by all concerned. Everyone was reluctant to abandon the ship and all hoped that she would run into calm weather. Carl Johnson, wheelsman, stood at his post with a life preserver on and with the water up to his waist. Chief Engineer Butler asked Capt. Morris to take the last seat in the yawl. "Not by a damn sight," replied the captain, as he helped Butler over the rail. Capt. Morris went down with the ship. The Yale, splendidly maneuvered at all times, ran right in among the broken timbers and threw a line to Morris, but he was unable to avail himself of it. It is supposed that he was badly injured by being thrown against some wreckage and was unable to use his arms. The Review has received the following communication concerning the heroic performance of the Yale:

"Editor Marine Review: The rescue of the crew of the steamer Sauber, except Capt. Morris and one of the crew, by Capt. Jackson of the steamer Yale at the time of the sinking of the Sauber in a very heavy gale on Lake Superior on the night of Oct. 25, was, I am convinced, an unusually meritorious act. I have learned from those who were on Lake Superior that night that the wind blew at the rate of 60 miles an hour. The particular circumstances of the rescue I have also learned, and among other things, that the Yale lay to windward of the Sauber from 11 o'clock p. m. until 3 o'clock a. m., when the Sauber went down, and was so maneuvered as to keep in position to afford some protection to the sinking Sauber, acting somewhat as a breakwater; and her being in that position and as close to the Sauber as it was possible to be prudently, enabled them to save the crew, who, at the last moment, had gotten into boats, lost their oars, and if they had been exposed to the full force of the wind and waves, the boats would doubtless have been swamped. As it was I am informed that within three minutes from the time the men took to the boats they had been picked up by the Yale. I believe it is a rule of the treasury department (now the department of commerce) that to entitle one to a medal for life saving the service must have been performed at considerable risk to the person doing it. If that be so, I think Capt. Jackson has qualified, for the Yale was grain loaded (grain in bulk) and while lying rolling in the trough of the sea to windward of the Sauber, the cargo of the Yale shifted, greatly imperiling the safety of the ship, and still the Yale maintained her perilous position until the last living man of the crew of the Sauber had been saved.

In justice to Capt. Jackson, and as an encouragement to others to emulate his noble example should opportunity offer, I think that application should be made by the Lake Carriers' Association, or the owners of the Yale or the Sauber, or all three parties, for a medal for Capt. Jackson; and I trust you will give the matter enough publicity to call their attention to it.

J. J. H. Brown.

Buffalo, Oct. 30, 1903.

LICENSES FROM THE ENGINEERS' STANDPOINT.

Editor Marine Review: Some time ago I saw an article in a Michigan paper entitled "The Masters and Pilots are Following in the Footsteps of the Marine Engineers' Association." It went on to state that it was known for some time that the organization of marine engineers would not allow any of its members to sign an application for engineer's license until the application was approved by the organization and that the associations of engineers and masters and pilots were taking this means of keeping applicants, young men in the service, from receiving licenses.

I am an engineer. Of course I know nothing about the workings of the Masters & Pilots' Association, but I wish to say a few words for the association of engineers with a view to putting this matter in the right light before the public. Our by-laws contain a section that forbids any member of the association from signing the application of an aspirant for marine engineer's license until the application goes before an examining committee of the association. It is the duty of this committee to look up the periods of service as specified in the application and see if the applicant has served the full time required by law. The applicant is required to furnish the committee with the names and addresses of the chief engineers with whom he has served. This committee goes in person to these men if convenient or corresponds with them with a view to learning if the statements set forth in the application are correct. If it is found that the statements are correct and that the applicant has served all the time required by law, he is furnished with a certificate under the seal of the association which he presents to the men whose endorsement he seeks for his application. Following the issuance of the certificate any member of the association is at liberty to sign his name. He knows then that the applicant has served his time; otherwise he would not know whether he was or was not putting his name to a document that was right. Of course this latter statement does not apply to an applicant who had served his full time under one chief. As you will see this precaution is taken simply to assure the signers of applications that the statements as to time of service are correct and to prevent dishonest men from getting a license before they have served the required time. It is not for the purpose of keeping any man from getting a license if he has served the required time.

The committee does not examine the applicant as to his qualifications as an engineer; that is the inspectors' business, not ours. Neither is the applicant asked to pledge himself to join our association in return for the certificate. I have been on one of these committees for three years and we have often helped the men to properly fill out the application forms. We give them all the assistance possible. We have refused three applicants in the three years that I have been on the committee. In these cases we found that the men had time in their application as firemen when they had been decking on the steamers. If it were not for precaution on our part the chances are that these men would have gotten their licenses without qualifying for them.

These are the facts as regards the engineers signing applications. If any one can find anything wrong in our practice I would like to see it in print.

An Engineer.

FALLING OFF IN BUFFALO TRADE.

Buffalo, Nov. 3.—There is much uneasiness over the future of the lake trade in certain lines, especially as regards the Buffalo-New York route for grain and flour, the published reports of export business done by the leading ocean ports showing a great diversion to routes both north and south of it. Still I find that the best-informed authorities are not going to change their tactics in order to stop the falling off, as they say they are not able to accomplish anything if they try. It is the old story of a division of interest. Let the other interest make the sacrifice. We are not able to do anything, and besides it is plainly not my affair. The package freight people say that the ocean rates are to blame for the loss of business at the port of New York and they are waiting for the ocean lines to come down. Instead of a uniform rate from the various ocean ports the lake lines are demanding that the differential which the lakes have to stand shall be made good by the ocean lines, but nothing is done and the diversion goes on.

It all seems to have been begun by the giving a slight advantage some time ago to the roads running to Newport News. The experiment was to be tried for thirty days—and it is being tried yet. There is added to this a practice of making cuts for large business in that direction and further south, which developed, when the Interstate Commerce Commission interfered, into the issuing of what has been derisively termed midnight tariffs. A line takes a block of freight at a cut and immediately publishes a tariff on that cut. For awhile all the lake lines immediately met the cut, but now at least some of them refuse and have drawn out of certain lines of business that they used to control.

There has been less flour coming down from the northwest this season than usual, especially as the southwest has suddenly become a great factor in the export flour trade, and in spite of its handicap the lake package-freight fleet has been able to make up a great part of the falling off from Lake Superior by taking this southwestern flour that originates at Missouri river points. One line manager estimates that not over two-thirds or three-fourths of the usual amount of Minnesota flour will be exported this year, but the falling off is quite made up from the southwest. There seems to be no attention paid by the package-freight authorities to the contention of the Minneapolis flour shippers that the falling off in business over this route from that direction is on account of the refusal to hold and handle flour in lake warehouses free. A line manager says that the present arrangement does not embarrass this trade. He does not deny that the St. Lawrence route is cutting down the business here and says it will go on increasing so long as present conditions continue and apparently the lake lines will do nothing to meet these Montreal rates, though the advantage is but part of a cent a hundred now. Again the ocean lines are looked to for relief.

Before this article is in print it will be known whether New York state is willing to rebuild the canal. It is maintained that even if this is done the rail lines will still carry the flour, but they will of course have to take it for considerably less than they get for it now and that will shut up the Montreal route just as effectively as though all the flour went by canal.

I find railroad men feeling quite easy over the possibilities of the barge canal. One of them, who says he favors enlargement and shall vote for it, still maintains that ten years hence, when the canal at the shortest would be finished, the rail facilities will be increased so that the roads will be in the lead as much as they are now. One thing is certain—the next decade in that case is going to see the development of a system of

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cheap transportation that most people do not dream of now. It is quite the idea that the railroad car has about reached its limit and that the ton-mile cost by rail will not go much lower. Still a great many things have developed already in this direction that were thought impossible even ten years ago.

The lake package-freight lines will, therefore, go on about as before. The two great lines centered here and at Erie will certainly not grow less and the small lines may before long be entirely absorbed by them or driven out, as the Wabash, Clover Leaf, Lackawanna and Northern lines have been, but the traffic is not affected by this. Such changes have become the rule of the lakes as well as of the road. Such changes do not affect the traffic question greatly. JOHN CHAMBERLIN.

WATERWAY FROM GREAT LAKES TO GULF.

A resolution as follows, indorsing the proposed waterway from the great lakes to the gulf and the Chicago sanitary canal as a part of that project, was adopted last week at the closing session of a meeting of the Interstate Mississippi River Improvement and Levee association held at New Orleans:

"Resolved, That the convention of delegates representing the states of the great Mississippi valley from Duluth to the Gulf of Mexico gives its unqualified approval to the movement for the construction of a waterway connecting the great lakes at the north with the Mississippi river and the Gulf of Mexico at the south. We recognize the expenditure of $35,000,000 by the Sanitary District of Chicago as a practical demonstration in the furtherance of this project.

"We express the hope that the senators and representatives in congress of the various states represented in this convention will give their encouragement and assistance to congressional legislation in favor of the completion of the deep waterway to which the Mississippi valley states have already given their approval, and to which the state of Illinois and the Sanitary District of Chicago are committed as a matter of policy and by great financial expenditures already made."

LAKE CARGO RECORDS.

The cargo of 185,399 bu. of corn, 40,000 bu. of rye and 43,600 bu. of wheat, 268,999 bu. in all, taken from South Chicago to Buffalo recently by the steamer Mataafa of the Steel Corporation's fleet, footed up in weight 7,619 tons (2,000 lbs.), or 87 tons in excess of the previous grain cargo record, which was held by the steamer Simon J. Murphy. Cargo records to date are:

Iron ore—Steamer Wm. Edenborn, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 8,807 gross or 9,864 net tons, Escanaba to South Chicago.

Grain—Steamer Mataafa, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 185,399 bu. of corn, 40,000 bu. of rye and 43,600 bu. of wheat (268,000 bu. in all), equal to 7,619 tons (2,000 lbs.), South Chicago to Buffalo; steamer S. J. Murphy, Donora Mining Co., Duluth, 269,000 bu. of corn, equal to 7,532 net tons, South Chicago to Buffalo; steamer Douglas Houghton, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 308,000 bu. of oats and 60,000 bu. of corn, equal to 7,520 net tons, Manitowoc to Buffalo.

Coal—Steamer I. L. Ellwood, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,688 net tons anthracite, Buffalo to Duluth; steamer John W. Gates, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,659 net tons of bituminous, Lorain to Duluth.

SUBSIDIES, HIGH TARIFF, OUR MERCHANT MARINE.

Editor Marine Review: The continual cry for a sea-going merchant marine should finally awaken the people to see the real cause of its decline and destruction. For nearly half a century a high tariff has prevented the importation of modern building material for ships and has raised the price of labor. Now that the material is produced in this country, prices of labor make it impossible to compete with foreigners in the building and running of ships. Under the high tariff the game of enriching a few at the expense of many has lustily been going on; and the artificially-raised prices of all commodities have enabled manufacturers and monopolists, not only to make large profits but to undersell foreigners in their home market, the profits in this country being so large as to cover any loss from underselling abroad. The high tariff, instead of benefiting the general public, has impoverished them by compelling them to pay higher prices for goods of their own manufacture than the foreigner, who has the benefit of lower prices because the articles sold to him have already partly or wholly been paid for by the high prices realized in this country. The tariff is the great prison wall surrounding this land, within which confine the people labor like convicts and wear the stripes so masterly symbolized in the prison flag, because of having to sustain life at such prices as the big corporations dictate. The impossibility of including the ocean in the high-tariff scheme has prevented the building and running of foreign-going ships at a profit and has caused the decline and destruction of the merchant marine in the foreign trade.

Every enterprise being subsidized by the high tariff at the expense of the farmer and the general public, the cry for subsidizing ships will not cease so long as the high tariff remains.

JOHN MAURICE,
Chicago, Oct. 30, 1903. Civil Engineer and Naval Expert.

QUESTION OF LOW FREEBOARD.

From the time that naval powers began to build battleships there has been a difference of opinion as to the value of low freeboard and vice versa. It is again brought to attention by the publication of part of the report of the naval board of construction on the designs of the 13,000-ton battleships. The dissenting member of the board, Admiral Bradford, in his minority report, makes this note: "The Idaho class would still be useless in a moderate seaway, owing to her low freeboard." The other members of the board disagree with the minority and declare the statement entirely unjustified by the facts or by experience. They add, in their rejoinder to Admiral Bradford's statement, that, by comparison, the freeboard of the Idaho is the same as that of the Virginia class and 6 in. less than that of the new Maine. The forward 12-in. guns and the eight 8-in. guns of the Idaho in turret, are carried 26 ft. above the water line or 6 in. higher than the corresponding guns of the Virginia, and 6 in. lower than the forward 12-in. guns of the Maine. The after 12-in. guns in turrets are carried 17½ ft. above the water line, or 2 ft. lower than those on the Maine, and the 7-in. guns of the main-deck battery are carried 14 ft. 9 in. above the water line, the same as on the Virginia. The majority report declares that in a seaway the Idaho will have superior fighting ability to the Maine.

This element of freeboard in warship construction was earnestly discussed by such men ar Sir Nathaniel Barnaby, Admiral De Horsey, Admiral Colomb and J. H. Biles before the Institution of Naval Architects in England as early as 1891, at a time when the British admiralty had under consideration the development and progress of the American navy. It was admitted by the British admiralty that the British navy had not a vessel that could be closely compared with the Baltimore, the Newark and the San Francisco, as in the period between 1883 and 1887 the cruisers built in England were belted, and, therefore, larger and more costly for the same fighting power, or, if of the same type, were smaller and slower. About that time the contracts were given for the Oregon, the Massachusetts and the Indiana, which were recognized as superior in design to any battleship in the British navy, especially in the matter of height of freeboard. The low freeboard type had been favored because they were supposed to be able to develop greater speed, but it was also recognized that this type had disadvantages which might be remedied; hence the question of freeboard entered largely into the discussions of the naval architects' convention. The proposition of the admiralty was to increase the height of freeboard about 15 in. on the new turret battleships and the proposition was strongly advocated. Although it had been recognized that the moderate freeboard has been associated with higher speed, the experience with vessels of the low freeboard turret type, such as the Thunderer, the Dreadnought and the Trafalgar proved to the contrary. It was remarked by Sir Nathaniel Barnaby, and he was not corrected, that if one may judge from the amount of water coming in on an Atlantic liner with a freeboard of 26 ft. the chance of fighting the big guns end on in a head sea is not promising to a warship of only 17 ft. freeboard.

RESULT OF ATTACK ON BELLEISLE.

A month ago the old British battleship Belleisle was sunk in Portsmouth harbor by the explosion of a torpedo under her hull, and so disastrous was the effect of the explosion that it has taken a month to get her afloat again, although she was in shallow water. The object of the torpedo experiment was to ascertain whether cellulose material made of corn pith could be relied upon to prevent the inrush of water when a ship has had a big hole knocked in her. Accordingly, on the Belleisle's hull, 10 ft. below the water line, a section had been constructed, representing a double bottom of a modern battleship, and this was packed with cellulose. The Belleisle was towed to Fareham creek in Portsmouth harbor and a torpedo warhead charged with gun cotton exploded under the false bottom. The effect was more disastrous than was anticipated. Not only was the false bottom blown to pieces, and the cellulose sent high in the air with the volume of water that followed the explosion, but a big hole was also made in the ship's bottom. The Liverpool Salvage Co. undertook to raise her but the task has been a difficult one, owing to the soft nature of the bottom. As fast as the mud was cleared away to enable the divers to work on patching up the rent the next tide would bring more mud back. At length a cofferdam was constructed inside the ship, and eight pumps, each capable of discharging 3,000 tons per hour, were kept at work with the result that the old battleship was finally floated and put in dry dock. It was evident that she had sustained serious damage, for the old vessel had a big list to port as she was being towed across the harbor and two immense pumps were kept continually at work upon her. When she was dry-docked the hole in her hull was covered with canvas to keep inquisitive persons from finding out precisely what had happened to her.

The latest dividend of the United States Steel Corporation goes to 40,128 preferred shareholders and 34,958 common shareholders, a total of 75,086 persons. This is an increase of over 12,000 shareholders in three months and shows that the stock has been widely bought during the recent period of low prices. No corporation in the world now approaches the Steel Corporation in the number of its shareholders.

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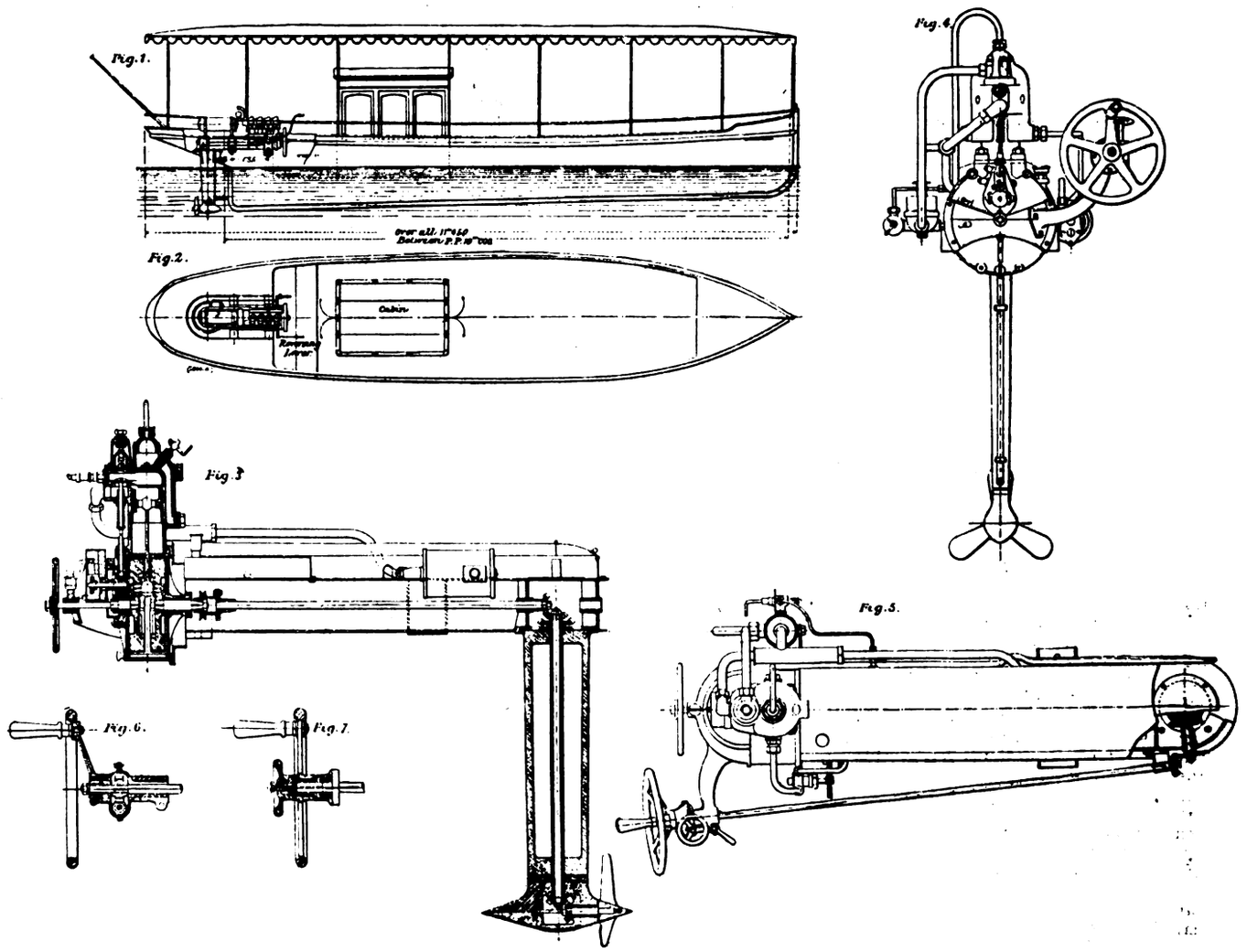
DETACHABLE MOTOR FOR BOAT PROPULSION.

The propeller for small boats that is illustrated on this page has for some time past attracted considerable interest in France and England and has been purchased in large numbers and different sizes by the war and navy departments of European governments as well as by private yacht owners. Its makers are the Societe du Propulseur Universel Amoville, of Neuilly-sur-Seine. The motor is of the petrol kind. Alcohol may also be used as the working agent.

The plan of the apparatus as a whole will be grasped by reference to the drawings, which are reproduced from Engineering of London. As Figs. 1 and 3 show, the motor and propeller form one complete unit, and can be placed in a boat or removed as a whole with the greatest ease. The main horizontal casting, at the front end of which is a light-weight petrol motor, is simply bolted to a couple of flexible planks spanning the gunwales at the stern of the boat. These planks, by their flexibility, absorb any vibration. The engine crank shaft is coupled to a horizontal shaft, as shown; and the latter drives by bevel gearing a vertical shaft supported on a narrow arm which hangs over the stern of the boat, in the place usually occupied by the rudder. A hollow shaft running down this arm carries at its lower end the shuttle-shaped casting shown, and by rotating this hollow shaft, by the bevel-gearing, best seen in the plan Fig. 5, this shuttle-shaped casting can be turned round through a complete circle. In it is the screw shaft, which, as shown, is driven by bevel-gearing from the inner vertical shaft, which, in turn, is driven by the engine, as already explained. There is no rudder, and the boat is steered by turning round the hollow shaft, and with it the shuttle-shaped casting carrying the thrust shaft. This method of steering is so effective that the boat can easily be turned completely round in its own length. The motion of the boat is reversed by turning the propeller completely round, and the boat steers as well when going astern as when running forward. A remarkable feature is the small weight of the attachment. Thus, when of 1¾ H. P., which is sufficient for small boats, it weighs only 144 lbs., whilst a 4½ H. P. attachment weighs 220½ lbs., and one of 8½ H. P. 282 lbs. The makers have already built attachments of this type capable of developing 72 H. P. Most of the metal work used is of aluminum. The main horizontal casting serves not only to support the shaft and provide for the fixing of the attachment to its boat, but also acts as a tank for fuel supply. As is perhaps best seen in Fig. 5, the motor is very similar to that used in motor bicycles. If the steering wheel is left loose, the boat remains at rest, even although the engine be running, since the propeller is carried round and round a vertical axis. Provision is, however, made for clamping this steering wheel, in which case the boat will run on its course without needing the attention of the steersman. For small boats the arrangement shown in Fig. 7 is applied to this end, but for larger sizes the arrangement shown in Fig. 6 is preferred, and this is the method used in the actual motor illustrated. Here, it will be seen, a worm-wheel is fitted, and the worm for driving this is carried in a casting which fits into a sleeve on the standing portion of the motor, in which it can be clamped fast by the locking lever, best seen in Fig. 5. When thus clamped, the steering is accomplished by turning the worm by the small hand wheel shown, so that there is then next to no strain on the steersman. If, however, the direction of motion is to be reversed, or intricate evolutions are to be performed, the locking lever is loosened, and the steering is then accomplished by the large hand wheel direct.



Detachable Motor for Boat Propulsion.

ERIE CANAL ENLARGEMENT CARRIES.

New York state has given a majority of nearly 250,000 in favor of the proposition that the state shall spend $101,000,000 for improving its canals. The plan is to widen and deepen the Erie canal so that it will accommodate barges of 1,000 tons carrying capacity, and to improve the Oswego and Champlain canals. Under the law the state will be allowed to issue not more than $10,000,000 of canal bonds at any time, and the first issue must cover the work for two years. The bonds are to run for not more than eighteen years. The advocates of the proposition declared that canal improvement was necessary for the rehabilitation of the commercial supremacy of the state. Unless the state canals are widened and deepened, they asserted, it would be but a short time before the railroads would be able to make such transportation rates as they might see fit, and that New York city would be discriminated against. Undoubtedly the enlargement of the canal will bring into being new industries. In fact a company to build and operate a large fleet of 1,000-ton barges is already being organized.

The German kaiser, desiring to give a cup for Atlantic yacht races, Sir Thomas Lipton has withdrawn his offer of a similar cup. The kaiser has now ordered Mr. George L. Watson, the yacht designer, to design a large racing schooner yacht for him to enter in a race across the ocean.

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BEARINGS OF NAVAL ENGINES.

By a Naval Expert Engineer, London.

This very important subject does not up to the present appear to have received the attention it deserves. In none of the numerous text-books, manuals, pocket-books, etc., on engineering which are published am I able to find out any specific information as to how to adjust a bearing properly, or what is the proper treatment to administer to one which has got damaged. Even the "Steam Manual," published by the admiralty as a vade mecum for the naval engineer is silent as to what ought to be done. The last naval maneuvers very forcibly demonstrated the importance of the subject, when several of our newest and most powerful battleships and cruisers were temporarily hors de combat through hot bearings, and even Mr. Chamberlain was delayed in his journey to South Africa in the new cruiser Good Hope through the same cause. That the admiralty does not specify for large enough bearing surfaces has a very great deal to do with it, but I cannot help thinking that if what surface is provided be kept in the highest state of efficiency the number of cases of failure on trials and during the ordinary work of a commission would be very much reduced. But to start with, there is no method of adjusting brasses in the navy at all, every engineer fitting his brasses according to his own ideas. In the large steamship companies there is a uniform system made out by the superintendent engineer, with the result that hot bearings are almost unheard of. Ask a dozen engineers in the navy how they adjust their brasses, and each one will tell you different. In the hope of, perhaps, giving a hint or two which may prove useful to your readers, and all of which are based on actual experience, I offer the following suggestions:

First, with regard to the lubrication, it is almost needless to say that the oil pipes must be kept clear and the worsteds kept clean. The latter should be occasionally washed in hot water and soda. The stokers who do the greasing in the navy are not all thoroughly acquainted with the laws of syphoning, and more than one hot bearing has come under my notice due to the fact that the level of the oil in the box was below the lowest level of the worsted down the pipe. The quantity of oil allowed by the admiralty is really sufficient if it is properly used; but, unfortunately, there are a large number of chief engineers of warships who have very confused ideas as to their stores, and erroneously imagine that they gain favor by saving up a surplus. Olive oil is undoubtedly the best lubricant for bearings, but, as the quantity supplied is hardly sufficient, a capital mixture can be made of two olive to one Crane.

Having attended to the lubrication, the next point demanding attention is the bearing itself. Bearings are usually adjusted in three different ways in the navy. The first is by "swinging," by which is meant that, after the bearing has been adjusted to the proposed position, the rod is taken in the hand and swung through an arc to test its tightness. This, naturally, is only applicable to small, light machinery. The second method is by flogging up the nuts on the bolts till the brasses grip the journal and then slacking back a given amount, calculated by the number of threads per inch on the bolt, the diameter from corner to corner of the nut, and the amount that the chosen corner has been eased back from the "hard-up mark." Liners are then inserted. The third is by inserting between the brass and the journal a piece, or several pieces, of lead wire, tightening up to the former position and then removing the wire, and by its thickness gauging the amount of clearance between the journal and brasses. I will deal with each of these methods in turn.

Swinging a rod is the best method for light machinery, which can be comfortably managed by one man, using only his right hand. A very little experience will teach how much to tighten up, but it should never be forgotten to put the check nuts on before swinging, as a rod which swings quite easily, will often be found too stiff to move by hand when the check nuts are tightened down. Granted that the rod swings satisfactorily, this proves nothing as to the bearing surface between the brasses and journal. An examination of the brasses may prove that they are only bearing on one corner; so to find out what is really the state of affairs under working conditions, a lead should be laid along the bottom brass, and two—if it be small—round the circumference. The flatness of the lead will show where the bearing surface lies, and this must be filed or scraped away till the lead comes out uniformly flattened.

Now, with regard to the second method, namely, tightening up and slacking back, which is much in vogue amongst the older naval engineers, there are several possible sources of error. In the first place, a powerful man with a heavy hammer can spring a long bolt and perhaps tighten up from a quarter to half an inch more than a weaker man with a light hammer. Not infrequently, the brasses themselves get sprung in at the "horns" and bulge out at the crown. Having tightened up to this movable "hard-up mark," the nut is slackened back, but no allowance is made for the wear of the threads and consequent slackness of the nut on the bolt. But my final objection is that, as in the case of swinging, no knowledge can be obtained by this method as to the amount of the bearing; it may be on a couple of small spots in the horns, which, when they have been scraped down, leave the brass a blank, unless the process of riddling with red lead and oil be resorted to, which is a very long and trying process, and not always accurate. The most accurate and, to my mind, only scientific method, is lead wire and a wire gauge. To adjust in this manner, all that is required is to insert the lead wire, one piece along the bottom and two or three round according to size of journal, tighten up hard on the liners, slack back, take out the wire, and put it into the slots in the wire gauge. It can be accurately measured to the thousandth of an inch by this method, and the record kept conveniently in a pocket-book, instead of filling the office with old leads, which get damaged; and all bearings can be adjusted to the same amount of clearances.

Now, with regard to the wire gauge, we will take the legal standard gauge, as this is now most generally adopted, although any engineer's pocket-book will give the equivalents in the other gauges. For the engines of a battleship or large cruiser, 24 L.S.G. will be a good adjustment for all the main bearings, 24 L.S.G. for the crank pin brasses, and 26 L.S.G. for the crosshead if of white metal, or 24 L.S.G. if of brass. Nothing should warm up at that, and no worry need be caused by a sudden great increase of speed, although the engines may not be perfectly silent at very low speeds. But you cannot adjust bearings so that the engines shall run cool and quietly at every speed, and safety at high powers is perhaps better than a slight bump when running slow. For the engines of smaller cruisers making from 120 to 180 revolutions per minute 27 L.S.G. for main and crank pin brasses, and 28 L.S.G. for crossheads will be found satisfactory. But it is always better to err on the slack side, because it saves the use of sea water, which not only spoils any journal, but decays the white metal through setting up galvanic action. The engines of destroyers can be swung, but if leads are required a 30 L.S.G. for main bearings and cranks and crossheads will run without trouble.

With regard to the thrusts, if they be of the now almost universal horseshoe type, they can easily be set with feelers; and I would here recommend all who have the adjusting of engines to purchase a wire gauge and a set of feelers, the cost of which will not amount to more than five or six shillings. First, the engines have to be got aft to the required position. This is easily done by slacking off the collars, and turning the engines astern by the turning engine. Should there be no marks to indicate when the engines are central, a very easy way is to try by feelers the clearances between the forward and aft sides of the link blocks and the fork end of the slide rod, that is, provided the engines are fitted with Stephenson's double bar link gear, which nearly all modern ships have. This is generally where the wearing forward of the shaft first exhibits itself, and I have always found if the valve gear is true the cranks and crossheads are not far out. Having got the engines central, the next thing is to tighten up the thrust collars, so that a very thin feeler can be inserted all round, which will prove that the collar and shoe are parallel, and that the bearing is taking all over. To go into the adjustments of all the other bearing surfaces would make this article too long, but it is hoped that enough has been said to show the importance of the subject. Carelessness and neglect are sure to appear, and generally at the most inconvenient time. Too much care to the exact measurement of all adjustments cannot be paid.

BELLEVILLE COMING INTO ITS OWN.

Sentiment in reference to the Belleville boiler in England has undergone so complete a change as to amount to revolution. No scorn at one time was too withering for this type of boiler; no praise at present can be too high. The English journals have been unanimous in their approval of the performances of this boiler. In fact they couldn't be otherwise and be fair. The record of the Spartiate put an effectual quietus upon the anvil chorus. Concerning recent performances the London Telegraph says:

"Those of us who thought that the Belleville boiler had been somewhat hastily condemned by the boiler commission, and as hastily abandoned by the admiralty, in deference to a certain amount of popular clamor raised by Sir William Allan and others, are beginning to find our justification. We shall find it more fully as time goes on. The Belleville may or may not be the best water-tube boiler; I hold no brief for it, and nothing but practical experience can show its merits or demerits in comparison with other water-tube boilers. But that the cylindrical boiler is as dead as a door nail is hardly open to question, and the sooner the admiralty recognizes the fact and makes the necessary adjustments in the boilers of some of the ships now under construction the better. The present Victoria and Albert is a standing testimony to the merits of the Belleville when it is properly understood. So is the Spartiate, which traveled 25,000 miles without a defect in her boilers of any kind, though her engines once gave a little trouble. During the recent maneuvers she steamed for ninety-six hours at 18 knots—because her engineers and stokers knew their business, though they had been changed three times in five months—and the maneuvers are really the best evidence of the merits of the Belleville. There was no break-down among the Belleville-boilered ships of the X fleet, and two of the three ships of the squadron which were not fitted with Belleville boilers were the two that dropped behind—the Cæsar and the Illustrious. True that they were not originally designed to steam as fast as the others, but the fact that the eight Belleville-boilered ships did so well says a great deal for the boilers. So do the performances of the Spartiate and Europa and of the Good Hope, which increased her speed from 9 to 19 knots in under ten minutes. The Belleville boiler wants a lot of keeping clean, but if it is thoroughly understood and properly treated it also wants a lot of beating."

Mr. J. M. Martin has resigned his position as district sales agent at the Philadelphia office of the Nernst Lamp Co., and Mr. A. E. Baker has been appointed as his successor.

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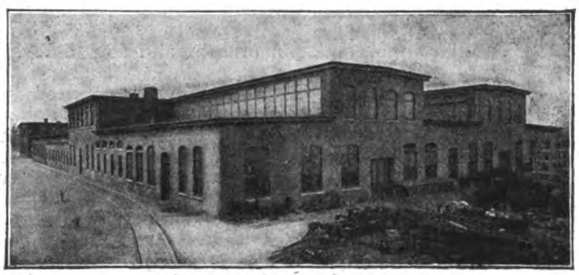
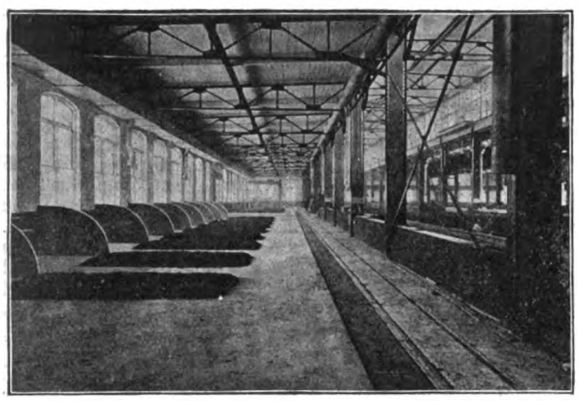
NEW WORKS OF B. F. STURTEVANT CO.

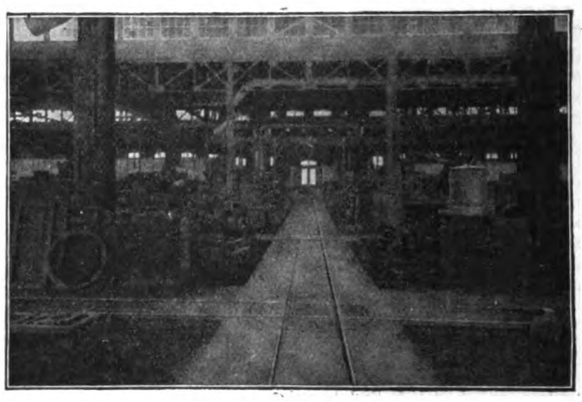
For several years the B. F. Sturtevant Co. has felt the excessive pressure of increased business and the necessity for much more extended facilities for manufacturing than those possessed by its old plant at Jamaica Plain, Mass. The fire which visited this plant in 1901 had the effect of definitely settling the question of removal, and plans were immediately begun for a thoroughly modern manufactory at Hyde Park, about nine miles from Boston, where an abundance of skilled labor is always available. The site selected was admirably adapted for the requirements. The tract of land contains over 15 acres and has a frontage of 1,300 ft. along the freight yard tracks of the New York, New Haven & Hartford Railroad, near its station at Readville. The water supply is ample and the space for dumping waste is sufficient to meet all requirements for years to come.



Foundry and Pattern Buildings.

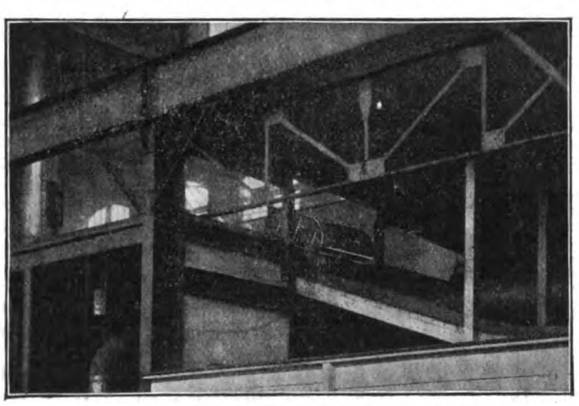


Foundry—Bench Molders' Floors.

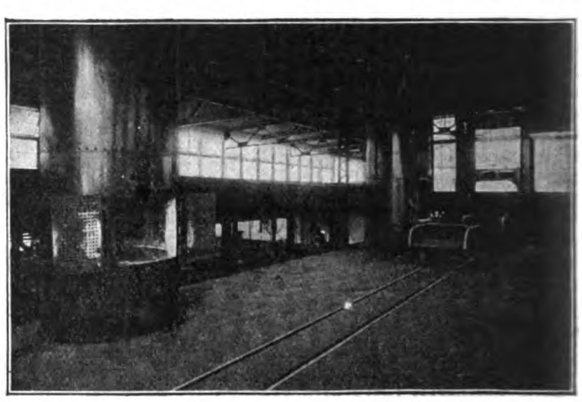


Looking Across Foundry.

The plant comprises a commodious four-story office building, measuring 45 ft. by 125 ft.; a three-story building 80 ft. by 500 ft. devoted to the manufacture of blowers, heaters and galvanized iron work; a building 80 ft. by 250 ft. of the same height, on the first floor of which all engines will be tested, stored and shipped, while the other floors will be utilized by the electrical department; a general machine shop measuring 120 ft. by 500 ft., with 40 ft. side galleries devoted principally to the building of engines; a forge shop 40 ft. by 100 ft.; a two-story building of the same floor area devoted exclusively to lockers, washing and sanitary facilities for the employes; a pattern and storage building 80 ft. by 150 ft. in ground plan; a foundry measuring 170 ft. by 350 ft.; a power house 80 ft. square with detached fire and service pump house. All told, the aggregate floor area of the buildings exceeds 9 acres. Brick has been used for all the walls. Steel columns and girders form part of the construction of such buildings as are equipped with traveling cranes. All upper floors are of plank with top course of maple, laid on heavy wooden beams and designed in the case of the principal buildings for carrying safe loads of 200 to 250 lbs. per square foot. The roofs are of heavy plank covered with tar and gravel.



Charging Car Entering Chute in Foundry.



Charging Floor of Foundry.

The arrangement of the buildings is a result of most careful study and endeavor to simplify to the limit the matter of intertransportation. Numerous spur tracks permit of ready handling of incoming and outgoing freight, while a complete system of industrial railways connects all departments. The industrial system is equipped with 12-lb. T rails laid 24 in. gauge on centers.

The foundry and pattern departments which form the subject of this description, were the first to be put in operation prior to the removal of the entire plant from Jamaica Plain. The pattern building is divided midway of its length by fire walls enclosing stairs, elevators, etc. One-half the building, with stories respectively 17 and 15 ft., is devoted to the flask and pattern making rooms, while the other half, provided with intermediate floors, making four in all, is utilized for pattern storage. The flask-shop, measuring about 60 ft. by 80 ft., is equipped with band, cross-cut and splitting saws, boring machine and lathe, all driven by a 10 H. P. Sturtevant motor suspended from the ceiling. The industrial railway runs directly into this room from the foundry across a distance of about 40 ft. and together with an overhead transfer truck reduces to a minimum the cost of handling flasks. This room also includes the metal pattern makers' department equipped with the necessary machine tools. Adjacent thereto is the locker, wash and toilet room for the building.

Immediately above, is the pattern shop abundantly lighted upon three sides and equipped with a full complement of tools including one single and two double saw benches, two band saws, a buzz planer and a double surfacer, five lathes, one of which is a 66-in. by 11-ft. gap lathe, a drill press, a core box machine, numerous wood trimmers, etc. All the power machines are operated by two 10 H. P. Sturtevant motors, both being required for ordinary work but one always serving as a possible relay in case of accident. The pattern storage department in this building is admirably arranged, not only from the standpoint of reduction in fire risk and facilities for handling the patterns but also as to the card and tag system by which they are located.

The foundry consists essentially of two long craneways each 35 ft. wide, a center bent of the same width, and side floors 30 ft. wide. The brass foundry, core room and wash room are located at one end; the charging floor at one side, nearly midway of the length; and the cleaning room at the other end. The craneways are designed for 20-ton electric traveling cranes. Those already installed are of the Whiting Foundry Equipment Co.'s make and are equipped with Sturtevant motors. Brick division walls 3½ ft. high running lengthwise of the foundry separate the floors on the lines of the columns. Lighting is secured through monitors in both of the craneways and through ample side windows. Each line of monitor transoms is operated in unison by a novel device installed by the G. Drouve Co. The western side of the foundry is given up to bench and small floor molding, the bench molders' floors being separated at the bench ends by wooden partitions. In the center line of each of the craneways and in the bent between them runs an industrial railway with turn-tables connecting with the cross aisles, which provides for the distribution of metal, etc., to all parts of the building. The floor between the craneways is supplied with a series of 1½-ton small traveling cranes of about 10 ft. span equipped with Sturtevant electric hoists built especially for this work. All materials are received from a track which runs along one side of the foundry and are delivered through wall openings to the bins which fill a portion of the side wing adjacent to the cupolas. For the present the sand storage bins and mixing room are also within this building.

An ingenious system of charging has been devised under which the charging cars pass at floor level in front of the bins, are there loaded with the requisite amounts, weighed, and passed to the elevator where they are raised to the charging floor. As

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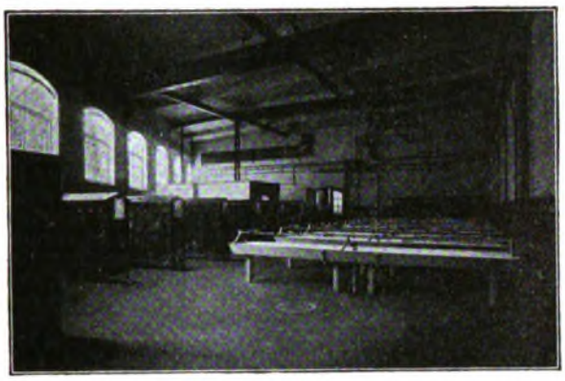
each car is unloaded it is pushed forward and started down an incline, whence it passes back in a direction opposite to that traversed while being loaded on the floor beneath. A novel apparatus gradually brings it to a standstill while yet upon the incline, and then releases it so that it may, by its own weight, roll on to an elevator which is automatically tripped and descends to the ground floor level. Here it is removed by one of the loading men and the elevator returned to its place above ready to receive another load.

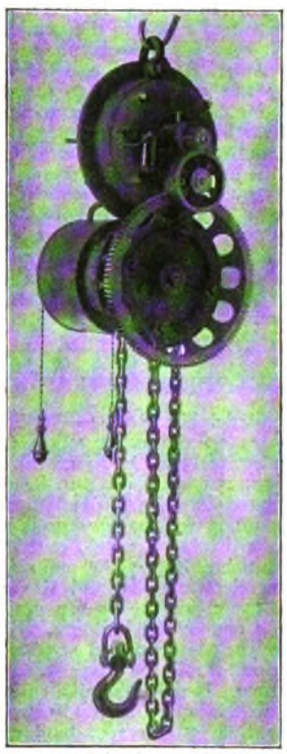


Wash and Locker Room of Foundry.

Pattern Storage, Third Floor.

The cupolas are two in number of Whiting make 56 and 72 in. in diameter. The opportunity has been improved to show the eminent adaptibility of the Sturtevant pressure blower; a No. 8 and a No. 10 blower driven respectively by a 30 and a 40 H. P. Sturtevant belted motor are supported upon the charging platform through which they discharge directly downward and thence to the cupolas. It is intended to make this installation the subject of critical experiment for the establishment of important principles. The entire transportation equipment (probably the most elaborate of any foundry in the country) including tracks, turn-tables, cars, trucks, etc., was designed and built by the Sturtevant Co.

The brass foundry, located at one corner of the main building, and with crane system and railway communicating with the balance of the foundry, is provided with four crucible furnaces and a special form of reverberatory furnace designed principally for the melting of babbitt or similar soft metals. In the core room are six ovens, and here also is an overhead traveling crane service providing for transfer to the industrial railway. Cleaning room and pickle room, both commodious, well lighted, etc., are equally well equipped.



One-Ton Electric Hoist.

One of the noticeable features in the equipment of the plant is to be found in the sanitary arrangements. Most generous provision has been made in the case of the foundry, which has a large locker and wash room. Expanded metal lockers to the number of 225 are already in position. Enamelled iron sinks, six in number, are served with tempered water and are generously patronized by the employes. A series of slate partitioned shower baths has proved to be very acceptable during the past summer. Within the same room is installed the time recording system so placed that a double line of men pass the board, one upon either side, as they go and come from the room.

Naturally the entire plant is heated and ventilated by the Sturtevant system, which, as applied to many other large works throughout the country, has several times been described in these columns.

A complete underground tunnel system is provided for distribution of steam and return of the water of condensation, distribution of electricity, compressed air, oil, etc., from the power house to the various buildings. The tunnel measures 5 ft. wide and 6½ ft. in height, and thereby offers ready access to its contents. In the pattern building and foundry the pipes are laid in concrete trenches covered by iron plates, which present equal facility for reaching the pipes and wires.

The German battleship Preussen was launched last week at Stettin in the presence of the emperor and empress. The ship was christened by the empress. Chancellor von Bulow made a speech in which he expressed gratification at the progress made by the German fleet under the strenuous initiative of the emperor.

ADVANTAGES OF THE STEAM TOWING MACHINE.

Referring to advantages from a wrecking standpoint of the Shaw & Spiegle steam towing machine, made by the American Ship Building Co. of Providence, R. I., the Marine Journal of New York says:

"Some time ago the steamer Orinoco, one of the large fleet built and owned by Capt. James Davidson of West Bay City, Mich., grounded, and it was thought that at least 20,000 bu. of grain would have to be lightered, but here the towing machine on the Orinoco proved itself a saving factor in a new way. One of Capt. Davidson's steamers, the Bermuda, anchored near the Orinoco, took the steel wire hawser aboard; then the steam towing machine was started, and the Orinoco floated after only taking out about 3,000 bu. of her cargo. Thus the towing machine proved itself to be not only a guarantee of safety when towing in rough weather, but one of the most powerful and efficient wrecking appliances possible to get."

"But a more recent case has come under our observation. Capt. Collison of the steamer Maverick of the Standard Oil Co.'s fleet has one of these machines on his steamer. He says it is simply perfect for towing, and he mentions a case where the Maverick was towing a large barge, which got aground, and was apparently grounded solid. The captain slacked up on the hawser, and, going off into deep water, planted his two anchors firmly; then started the towing machine by the hand lever and took up the slack completely. Then, as the sea lifted the Maverick, a strain was brought on the hawser, and the stranded barge very soon began to give slightly and then to move. Of course the heavy swell which lifted the Maverick, at the same time tended to loosen the barge, but the towing machine, which had a high pressure of steam on, took up the slack as fast as it occurred, and very soon pulled the barge off into deep water.

"There could not be a more perfect machine for wrecking than the towing machine, which has such decided advantages that it seems strange that all towing companies wishing to do their work economically and safely should not adopt it. The following are a few of the advantages which this machine gives over the old methods of towing:

"1. It prevents the parting of hawsers in towing, and this affords a great saving in the cost of hawsers.

"2. It adds a great factor of safety to the business.

"3. With this towing machine a barge can be towed one or two knots faster in rough weather with the same expenditure of coal than can be done without it.

"4. It saves expense in labor. In handling the heavy manila hawsers men are required, whereas with the towing machine, in paying out and taking in the hawser, there is no handling of the line by the men. One man at the lever pays out the hawser direct from the drum, and when taking it in it is wound directly on the drum, so that it does not have to be handled at all.

"5. As a wrecking machine it has no equal for economy and saving in time. When a barge gets ashore, the quicker it is released and pulled into deep water, the less the damage and expense entailed. These and many other advantages make this machine almost indispensable to economical and safe towing."

It is reported that ship owners at Bilbao are in financial difficulties, which does not appear strange when it is learned under what conditions they engaged in the shipping business. It appears that in the years 1894 and 1895 a few firms in Bilbao purchased steamers during the depression at about $25 per ton. During 1899, upon this exceedingly low valuation, British ships paid 40 per cent. and Spanish ships even more. Investors at Bilbao lost their heads, and thinking that shipping always paid these dividends went headlong into ships. It is reported that they absolutely forced money on ship owners and acquired ships at figures upon which they are now unable to pay dividends.

The marine department of the Maryland Steel Co. at Sparrow's Point, Md., is enjoying the most prosperous period in its history. During the past three months several hundred extra men have been given employment in this branch of the company's industry. The force now aggregates nearly 2,000 men.

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SHIP SUBSIDIES FAVORED.

By Walter J. Ballard.

From the Protectionist for October the following opinions in favor of building up our ocean merchant marine by a reasonable system of ship subsidies, are culled:

Instead of wondering that there are so few American deep-sea ships left, ought we not rather wonder that there are so many? We now have 873,000 tons of American shipping registered for foreign commerce—just about one-third of the fleet of 1860. We have 155 deep-sea steamers of a tonnage of 398,000—rather less than the steam tonnage of Japan. Our ocean mail act of 1891, passed in the face of bitter opposition, has kept alive a half dozen American steam lines to foreign waters; and a few steel sailing ships and a few hundred wooden square-riggers and schooners flying the Yankee ensign are still fighting their brave way around the world. But this fleet shrinks and shrinks steadily. It fell off 6,000 tons last year, and for two years not one order for a deep-sea ship has been placed in any American ship yard. Our American ship owner in foreign commerce must buy his ship in this country if he would sail it under his own flag; he must have American officers; he must give his crew a larger and better forecastle and better food and more of it than his foreign competitors—all this by act of congress. Yet this American ship owner, building his ship and officering, manning and maintaining it under protectionist conditions, is now, and for many years has been, compelled to meet under free trade conditions his foreign rival, who can build his ship with the cheapest labor in the world, man it with the cheapest labor, and provision it on a scale that to an American sailor would mean starvation—and not only this but the American ship owner must often compete with subsidies and bounties bestowed with a liberal hand.—Winthrop L. Marvin.

American shipping, it seems to me, like all other of our industries and interests, should be brought under the great principle of protection, not indiscriminate, exorbitant and unreasonable, but such as William McKinley and his like would approve. If more than this is required to encourage and establish an American marine, it shows that natural conditions favor other treatment of American commerce. Let us try duties.—H. L. Wade, Waterbury, Conn.

Not one contract for vessels for foreign trade made by American ship yards this year. I am in favor of direct subsidies.—Calvin Wells, Pittsburg.

A duty should be put on all items to protect American workmen and merchants, and the government give all the aid that it possibly can by appropriations and subsidies and take full and good care of all American ships and be loyal to the flag and the United States.—James H. Gay, president John Gay's Sons, manufacturers of carpets, Philadelphia.

I believe a direct subsidy would have the effect of increasing the tonnage under the American flag more rapidly than a system of discriminating duties. That such a policy would be effective was clearly demonstrated three years ago, when it was expected that legislation along these lines would be enacted, by the large tonnage ordered from American ship builders for use in the foreign trade.—F. W. Wood, president Maryland Steel Co., Sparrow's Point, Md.

I have been a consistent Republican for years—since I was born. I believe in reasonable protection of our industries, and reasonable subsidies when needed, but especially trade treaties with those who will treat us fairly and reciprocally in the matter of duties on imports.—Dan F. Bradley, president, Iowa College, Grinnell, Ia.

I have long been interested in the subject of the revival of our shipping, which is in such a deplorable condition at present. Our motto for the last three-quarters of a century has been protection for products, free trade and special privileges for the ships that carry them, with their natural results, as at present. The regulation of commerce is a perfectly proper act; in a letter to the state department several years since, I asked why it could not be done, and was told in reply, "it would be against the conventions." The present status is a disgrace which should be removed as soon as possible. Anything that can be done in this line will have my earnest assistance, as it should have of every citizen who loves "Old Glory."—Allan D. Brown, president Norwich University, Northfield, Vt.

I prefer a subsidy to any other system.—E. M. Wilson, president Western Iron & Steel Co., Lake View, Wash.

A subsidy system should be applied. If this is the system of bats and owls (as claimed by the New York Evening Post) it is at least the one just indorsed by England as to the Cunard Line.—Curtis Guild, Jr., Boston.

I favor subsidy system well defined within constitutional limits for all American ships carrying the American flag.—I. H. Michenor, Bank of North America, Philadelphia.

I believe that every constitutional means should be used to foster, protect and encourage our ship building industries, to the end that the United States may be in a position to recover what we have lost of our foreign carrying trade.—Miles M. O'Brien, New York.

Subsidy as soon as possible. Fight with their own weapons until a better method can be devised.—E. B. Kimball, Burlington, Vt.

For the upbuilding of our merchant marine I decidedly prefer a subsidy system. I was a ship master for many years and have been all my life engaged in the shipping business. Though a free trader and a Democrat, I believe very strongly that as the government has lent a hand to encourage other industry save shipping this, too, must be included in our economic policy, in general an unwise one, as I think, is to be made consistent. Perhaps if we had absolute free trade, our ship owners could take care of themselves. But we do not have free trade. We build our vessels with protected labor; we pay protectionist prices. Moreover, on the sea, however it may be ashore, all our competitors pursue a protective policy, as witness the new huge British subsidy to the Cunard Line. I remember as a boy and young man when the ports of the world were crowded with American vessels. Our ships were the sea's aristocracy. I have just returned from a long journey to the Far East, and in all the harbors of the Orient I saw but six American ships, where they were once numbered by the hundreds. We have, rightly or wrongly, given the manufacturers protection, and made the United States the greatest manufacturing nation of the world. Let us see what protection will do for our shipping. I know that discriminating duties served well in the old times but important treaties stand in the way of their re-enactment. Moreover, how about the articles that are imported duty free? Feeling as I do I cannot recommend taking these from the free list, even for the sake of encouraging American ship owners. Foreign governments might easily retaliate and match our discriminating duties with duties of their own. The subsidy system is the system already adopted by our rivals. They cannot object if we take a leaf out of their own book. We tried subsidies to mail lines successfully before the Civil War, and ought never to have abandoned them. You will find, I think, that the subsidy policy is strongly preferred by practical men in close touch with modern shipping conditions.—W. F. Humphrey, treasurer Boston Towboat Co.

If protection is the broad national principle that we claim it to be, it should be extended to all industries that are exposed to foreign competition. None is worse exposed than shipping in the foreign trade. All our great interests on land are year by year becoming more and more interested in trans-oceanic trade. We need vessels of our own, as much as we need traveling salesmen, to advance this trade. It is nonsense to charge that such a policy is inconsistent with protection and to contend that if we will only throw down the bars to trade there will be so much business for all vessels that our own unaided ships will get their share. National protection was never intended to destroy or diminish foreign trade. On the contrary, by developing and enriching a country it makes an increased foreign trade possible. This is demonstrated today to the complete discomfiture of the free trade theory. As for vessels, they will become profitable enough to tempt American capital and enterprise when they are as well cared for by the government as the vessels of commercial rivals are cared for by their governments, or as our home industries are cared for by our government. It is not a question of open competition and no favors anywhere. It is a question of meeting foreign subsidizing and discrimination, which often amount to foreign aggression. It is a question of having commercial scouts, of maintaining a picket line, of being independent, and our own history shows that we can achieve all this on sea as well as on land, without invading the rights of any other nation and without giving any one just cause for offence.—Albert Clarke, president United States Industrial Commission; secretary Home Market Club, Boston; editor of the Protectionist.

PHILADELPHIA SHIPPING MATTERS.

Philadelphia, Nov. 4.—William Steele & Sons have called for estimates on the construction of the new armor plant for the Midvale Steel Co. at Nicetown, this city. The plans call for a building, 196 by 336 ft., to be of structural steel, with sides of corrugated iron and foundations of concrete, brick and stone. The building will be of various heights, ranging from 38 to 96 ft. There will be two wings, each 40 ft. in height, on either side of the main building. The main span will support a runway for a 150-ton electric crane and also a 75-ton electric crane. In both wings there will be 20-ton cranes and another in the extreme western end of the building. Bids are due Nov. 9 and the cost of the work is estimated at $600,000. The cost, including the installation of all the necessary equipment, is estimated at about $2,000,000. It will take about fifteen months to erect these works. They will be close to the present forge shops and it is said that in due time 55 acres of land will be covered by the company's various buildings and 6,000 men will be given employment. The Midvale company was started in 1860 and has steadily forged ahead. In the Spanish war it broke all records in manufacturing ordnance steel for the government. Officials of the company express themselves as confident of being able to make armor plate that will meet all government requirements. The board of directors of the company is composed of Charles J. Harragh, the president; James F. Sullivan, vice-president; H. M. Diemer, secretary, and John C. Dessolet, treasurer. These four manage the business of the company, and with the exception of Mr. Sullivan, none of the men are identified with any other business. There are, it is stated, not more than fifteen stockholders.

"League island will be the future general rendezvous of the marine corps," asserted Admiral Sigsbee, commandment of the yards last week, referring to General Heywood's annual report, in which that official advocated such plan. "It will not only be the marine corps center," said the admiral, "but it will be one of the greatest naval centers of the world. We have room here to expand. The yard has progressed marvelously during its short life and there is no saying what its future will be." Colonel Cochrane, commandment of marines, heartily coincided with Ad-

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miral Sigsbee's views and added that there was easily room at League island for buildings to accommodate 3,000 men.

The Philadelphia section of the Navy League of the United States, at its annual meeting last week, elected the following officers: Chairman, Alexander Van Rensselaer; treasurer, Dr. George C. Stout; secretary, Charles O. Bond—office, Twenty-Second and Filbert streets. Three councillors, Theodore M. Etting, L. T. McKee and Secretary Bond, were elected to attend the national convention of the league, to be held in New York city Nov. 12. As already noted, one of the primary objects of the Navy League is to encourage naval marine construction.

The new steamship line between Philadelphia and New Orleans seems assured. Options have been secured upon several vessels to run on the line, the promotors, including James Porch, chairman of the New Orleans Trades' League, and N. B. Kelley, secretary of the Philadelphia Trades' League, are in favor of building new steamers as soon as possible. Ample wharfage facilities have been secured at both ports. This will be practically a new trunk line for this city to southern and southwestern territory and it will obviate much inconvenience that has been experienced by rail delays and car shortages.

At the last meeting of the Maritime Exchange a resolution was passed declaring opposition to the action of the Trades' League which asked for prompt action by President Roosevelt in selecting a route and commencing construction of an isthmian canal. The Maritime Exchange believes it "would be indelicate, and quite superfluous, at this time," to urge any such action upon the president.

The contract for repairing and fitting out the Hell Gate dredging plant, which is to be used on government work in the Delaware river, was awarded last week to Quigley, Davis & Dorp of Camden. A large part of the plant has already been brought on from New York and the remainder is en route. The work of getting the dredges, machinery, etc., into good condition will take time and it is not expected the dredging plant will go into operation until early next spring.

It is stated that the International Mercantile Marine Co. has decided to dispose of as many of its small steamers as possible and put in their places larger and more modern craft. It is understood locally that an agreement has been made whereby the International company is to handle the entire export business of the United States Steel Corporation.

Plans are being considered for the building next year of two new steamers for the Long Island railroad. These boats will be put on the route between New York city and Greenpont, Sag Harbor and Block island, the business of which is growing constantly. Local ship builders, it is understood, have received queries concerning the cost of steamers suitable for such service.

G. C. Morris, boat builder, launched a 32-ft. torpedo-stern launch last week at his Holly Oaks, Del., yard. It is being built for Wilmington parties. He is also fitting up a 50-ft. launch for Philadelphia parties, and has closed a contract for two 50-ft. launches for New Jersey parties.

Barge No. 10, the largest car float ever built at the Harlan & Hollingsworth works, Wilmington, was taken to Norfolk last week and turned over to the owner, the New York, Philadelphia and Norfolk Railroad Co. Charles J. Langell, assistant manager of the Harlan & Hollingsworth Co., who was recently seriously ill, is convalescent. Edwin B. Sadler, naval architect of the company, has charge of the work at the Crescent yard, Elizabethport, N. J., during the temporary absence of Manager D. C. Reid.

Application will be made at Harrisburg Nov. 9 for a charter for the Western Electric Co., the object of which is to manufacture electrical tools, appliances, power motors, etc. The incorporators are Arthur D. Wheeler, E. M. Barton, H. B. Thayer, C. G. Du Bois, De Forest Hicks and N. Du Bois Miller. The Western Electric is the company which will build a factory 170 by 240 ft. in dimensions, two and three story brick, at Eleventh and York streets.

William Mitchell, known as "Uncle Billy," the oldest employe of Roach's ship yard, Chester, dropped dead from heart disease in the yard last week. He was seventy-six years of age and worked at the yard prior to the purchase of it by John Roach in 1871.

GOVERNMENT REPORT ON ENTIRE LAKE TRAFFIC.

In a summary of internal commerce of the United States, issued by the bureau of statistics, department of commerce, receipts of freight at 146 ports on the great lakes up to Oct. 1, 1903, are reported at 42,482,322 tons (2,000 lbs.), as against 40,102,870 tons on the same date in 1902. The registered tonnage reported shows that the arrivals for the nine months of 1903 were 56,255,791 tons, compared with 55,134,073 tons for the same period in 1902.

During September of the current year 1,957,098 tons of coal entered into the coastwise trade of the lakes, and 677,892 net tons were sent to foreign ports in the lake trade. For the nine months ending with September 11,402,501 net tons of coal were shipped in the domestic lake trade and 4,556,244 net tons in the foreign lake trade, making a total of 15,958,745 tons. This total includes coal loaded on steamers for their own fuel.

Low rate for Thanksgiving via the Nickel Plate road for points within 150 miles from place of starting. Tickets on sale Nov. 25 and 26, good to return till Nov. 30, 1903, inclusive. See nearest agent or address E. A. Akers, C. P. & T. A., Cleveland, O. 207, Nov. 30

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (SEPTEMBER, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	355,560	H. P.
English Royal Navy	929,300	"
Russian Imperial Navy	227,500	"
Japanese Imperial Navy	122,700	"
Austrian Imperial Navy	56,700	"
Italian Royal Navy	13,500	"
Chilian Navy	26,500	"
Argentine Navy	13,000	"
The "Messageries Maritimes" Company	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500	"
Total Horse Power of Boilers in Use	1,850,860	

Societé Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

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SEEN AND HEARD ON THE LOOKOUT.

According to a conservative estimate it cost $900,000 to prevent the English from "lifting the cup" in the recent international yacht races. While only two nations are directly interested in this contest for deciding the cup's place of abode, practically every nation having a vestige of right to be called both maritime and civilized has attempted at one time or another to "lift the pole." It would be a fallacy to suppose that any member of the syndicate that furnished the large amount needed to prove America's supremacy in the art of yacht designing considers this money wasted, and if it is understood that for about a quarter of the sum above referred to Lieut. Peary is prepared to "lift the pole," no one can seriously fear, especially at a time when prosperity and comfort, like Gog and Magog, are stalking through the land, that failure to be presented with a check, for say $200,000, caused Mr. Peary to refrain from traveling to the top of the earth. When Nansen returned he stated that further expeditions would be superfluous, as the Fram had sailed to within 250 miles of the goal, and everything that might be regarded as necessary to know concerning this northern region had been carefully observed. Mr. Peary, however, longs to cover these 250 miles for the purpose of displaying Old Glory in a place that can boast of but one day and one night in the year. The United States government's contribution is a three-years' leave of absence for Mr. Peary.—Next.

Civilization has been called a veneer, and in some cases it has been unexpectedly shown to be only very thinly applied. Coming under British influence an African chief adopted the English manner of dress and went to live in London where he frequently preached in the churches. During one of his harangues before a large audience, the accidental unfastening of his collar, freeing his neck from the so-unwonted restraint, aroused the dormant instinct of the savage, and, after discarding his clothes, he set fire to the church. Another case where a desire to possess $6,000 rubbed off the above mentioned veneer, and metamorphosed two previously highly-respected white men into swashbuckling pirates was reported from the Philippines. It appears that two officers who had acquitted themselves with exceptional distinction in the army stole the sum named and put to sea in a 30-ton vessel. The account of the cruise reads stranger than fiction and ends dramatically with the death of the pirates and the recovery of their plunder. No longer do ships' captains anxiously scan an approaching craft for fear of her being a pirate, but for this immunity from the horrors of piracy the navies of the nations must be given credit, and persistent advocates of disarmament however violently opposing the by-Tolstoi-so-effectively-described martial ardor, should not object to reasonable naval appropriations so long as that layer of veneer, known as civilization, has not been generously applied to all this world's inhabitants.

Though it may be doubted that the average ship's captain ever ponders deeply over matters pertaining to the negro problem, or even that he has ever in an off-hand manner looked upon the colored man, like Darwin's gorilla, as an inferior brother, it is nevertheless true that on vessels carrying a so-called "checkerboard" crew the color line is mostly strictly drawn. This is not intended, however, to create the impression that the fair-complexioned variety of seamen enjoy privileges that are not granted to their darker hued confreres. When equal parts of black and white seamen compose the ingredients of a ship's crew, a sprinkling of black and white in each watch is not thought expedient. The mate's watch is made up of negroes, and their white shipmates are all in the starboard watch; and this arrangement is not on the principle of letting birds of a feather flock together, but for the purpose of getting from the men more work than would be done by a crew of uniform-complexioned mariners. With the mates (carefully prompted by a wily master) guardedly dropping admiring kicks as to the amount of work done by "the other watch," the individual members of each "other watch," unconsciously spurred on by racial rivalry, vie with each other in their attempts to be called the most efficient and the quickest. Obviously the contest is ever called a draw, and as in the case of those unfortunates described by Dante, who so persistently pour water in a perforated tub without being aware that their labor is in vain, the "other watch" always remains the best without knowing it.

While none dare gainsay the steamer's usefulness, the average sailing ship is unequivocally more ornamental, and poets of all nations have made use of the resources their several languages could command to describe the beauty of the white-winged craft. As if it were not bad enough to have the ugly tramp steamer substituted for the graceful clipper ship, a writer in a French journal avers that the change has caused the modern sailor to lose his propensity for singing. The hoisting of sails being done by steam, the necessity of the so-called "chanty" has been obviated, but anyone who has ever had the misfortune to hear a "chanty" as rendered when heaving anchor or setting a topsail must feel pleased that it has been replaced by the noise of the steam winch. Rather good singing was heard recently on board a White Star Line steamer when the firemen were spending their Saturday half holiday on the forecastle deck. On account of the incongruity of hearing what these firemen called the "Chamberlain song" shouted on the deck of Mr. Morgan's steamer the chorus is herewith given:

Buy! Buy! Buy! Of the John Bull store,
The Deutscher and the Yankee we shall want no more;
And the money that we gain
Will in British hands remain,
If we buy at the John Bull store. F. H.

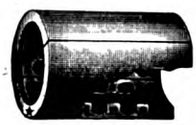
SHIP BUILDING IN OCTOBER.

The bureau of navigation, department of commerce, reports that 109 vessels of 43,975 gross tons were built in the United States and officially numbered during the month of October, 1903, as follows:

	WOOD				STEEL, ALL STEAM*		TOTAL	
	SAIL		STEAM					
	No.	Gr'ss t'ns	No.	Gr'ss t'ns	No.	Gr'ss t'ns	No.	Gr'ss t'ns
Atlantic and Gulf	37	2,701	28	1,767	2	935	67	5,403
Porto Rico	1	17	..	.....	..	.....	1	17
Pacific	1	8	6	467	..	.....	7	475
Hawaii	..	.....	..	.....	..	.....	..	.....
Great lakes	..	.....	2	22	8	36,646	10	36,668
Western rivers	..	.....	24	1,412	..	.....	24	1,412
Total	39	2,726	60	3,668	10	37,581	109	43,975

*No steel sailing vessels.

All the large steel steam vessels included in the foregoing summary were built on the great lakes. Among them are the Wisconsin, 4,858 gross tons, built at West Superior; Western Star, 4,764 tons, built at Wyandotte; Joseph C. Gilchrist, 4,725 tons, built at Lorain; Henry S. Sill, 4,720 tons, built at West Superior; R. E. Schuck, 4,713 tons, built at Lorain; Frank W. Gilchrist, 4,551 tons, built at West Bay City, Mich.; Percy G. Walker, 4,470 tons, Chicago; P. P. Miller, 3,844 tons, Buffalo.



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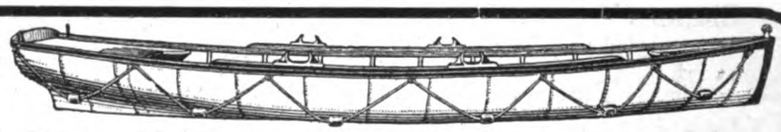

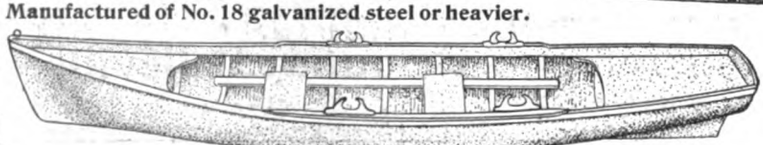

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TRADE NOTES.

The Lunkenheimer Co., Cincinnati, has opened a branch office in Paris, located at No. 24 Boulevard Voltaire, where they will carry a complete stock of their goods.

Never in its history has the Kingsford Foundry & Machine Works, Oswego, N. Y., had so many marine boilers under construction as are now going through their shops. Their orders cover all types and come from all sections of the country.

Although the St. Louis exposition is built partly upon a side-hill, it will be necessary to raise some of the drainage and sewerage by pumping, in order to effect its disposal. For this purpose the authorities have purchased from Henry R. Worthington four 12-in., vertical, centrifugal sewerage pumps, each having a capacity of 3,000 gallons per minute and capable of operating against a head of 60 ft. These pumps will be driven by Westinghouse vertical-shaft induction motors.

Geo. E. David, engineer and machinist in the service of the United States bureau of fisheries at Woods Hole, Mass., send unsolicited to the Smooth-On Mfg. Co., 572-574 Communipaw avenue, Jersey City, N. J., the following regarding Smooth-On iron cement for repairing leaky boilers: In March, 1903, we bought of the Walworth Mfg. Co., Boston, 25 lbs. of your Smooth-On compound to repair a leaky boiler, on which boiler makers had been at work but had only succeeded in stopping the leaks for a short time.

When industrial combinations were formed in great numbers two or three years ago, it was said that the traveling salesman, the drummer, had seen his best day; that the trusts, so called, would have little use for men on the road. "I do not think there is now as much force to that opinion as there was some time ago," said D. E. Lynn of Port Huron, who sells to the marine trade lead and Phoenix metal for the National Lead Co. "Of course our company has no monopoly of the business and can not be classed with the trusts, but it seems to me that no matter what line a concern is engaged in they must have some one all the time in close touch with the trade if they are to secure the orders." And in Mr. Lynn's case it can certainly be said that he is in touch with the trade. On the lakes especially, he not only keeps up a close acquaintance with everybody authorized to place an order for supplies, but he is so fully informed regarding marine matters that he has something to talk about wherever he goes.

"The boiler is of Scotch type and the leaks were around the ends of the furnaces. In applying the compound I first cleaned the surface of the iron inside the boiler and then washed it thoroughly with gasolene; then painted on a coat of compound and let it stand twelve hours. Then I mixed a thick putty of compound and pressed it well in the joint, let it stand twenty-four hours, and it was a success. The boiler has been in use now for three months and is tight. I have also used the compound for making pipe joints, and have found it excellent."

PRESIDENT ROOSEVELT TO ADMIRAL BOWLES.

In accepting the resignation of Rear Admiral F. T. Bowles' commission in the naval service, President Roosevelt sent the admiral the following note:

"My Dear Admiral Bowles: Your resignation of the appointment of chief constructor, United States navy, and of your commission as a naval constructor, to take effect Oct. 31, has been received, and I accept it with regret. Your services to the navy, and therefore to the country as a whole, have been notable, and I desire to express my sincere appreciation of them. Sincerely yours, THEODORE ROOSEVELT."

Duck and quail hunters—Half-fare rates to parties of three or more traveling together on one ticket via Nickel Plate road to McComb and Payne, O., and points between those stations; also to South Whitley and Will Vale, Ind., and intermediate points. Tickets on sale Nov. 9 to 30, inclusive, good to return till Dec. 3, 1903. See nearest agent or address E. A. Akers, C. P. & T. A., Cleveland, O. 201, Nov. 30

Galveston, Texas, Oct. 7, 1903.

Sealed proposals, in duplicate, for grade raising at Galveston, Texas, involving over 11,000,000 cubic yards of filling, will be received by the Chairman of the Grade Raising Board, until 2 P. M., Dec. 7, 1903, and then publicly opened. For information apply to E. R. Cheesborough, Secretary Grade Raising Board, Galveston, Texas.

Dec. 8 C. S. RICHE, Consulting Engineer.

Gasoline Launch for Sale.

Gasoline launch, 7½ by 35 ft., 12 H. P., double cylinder engine; canopy top, new curtains, leather cushions; lights; staunch and speedy, all complete. Cost $1,800; will sell for $1,200. Must sell to close estate. Wm. J. St. Aubin, 538 St. Aubin ave, Detroit, Mich. Nov. 5

Patent Rights on Life-Saving Appliance.

For Sale.—In part or as a whole. The patent rights issued and pending on a high grade steel life-saving appliance for use on board ships at sea. Correspondence solicited from gentlemen of large influence in maritime affairs or manufacturers of ship fittings Price nominal. Appliance is thoroughly standardized on a commercial basis and highly endorsed. Address Box 52, the Marine Review Pub. Co, Wade Bldg., Cleveland. Nov. 5

Dredging Plants for Sale.

For Sale.—Two dredging plants complete, consisting of two dredges, tugs Maytham and Duncan Robertson; also five dump scows and two flats, with sundry duplicate parts of machinery, etc.; also extra spud anchors and dipper teeth, etc.; all having been kept up in good working condition and comparatively new, and could be delivered at once on satisfactory sale. For further information as to capacity and prices of each plant inquire of James Pryor, Houghton, Mich. Nov. 12

WHITE OAK
TIMBERS, PLANK AND DIMENSION STOCK
F. S. SHURICK,
18 Broadway, NEW YORK CITY

For Sale.

Tug Duncan City. Address, Geo. Pankrantz Lumber Co., Sturgeon Bay, Wis. tf

Gasoline Engine for Sale.

For Sale Cheap—One 16-H. P. Superior gasoline engine. Used less than three months. Address Alpern & Co., Alpena, Mich. Nov. 12

Tug for Sale.

Tug Warwick—Engine 15x17. Boiler allowed 110 lbs. steam. Both in first-condition. Hull practically new. Boat inspected and ready to run. Cheap for cash., Can be seen at Toledo, O. Apply to James Rooney, 1118 Collingwood ave, Toledo, O. tf

Small Steam Barge for Sale.

I have for sale a small steam barge. Carries 250 tons. Address, Capt F. E. Wood, Alexandria Bay, N. Y. tf

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J. STEFFENS, 57 East Twenty-second st., Chicago. tf

Wanted.

Ship yard rolls to take in 20 feet length. Wire price and particulars to
POLSON IRON WORKS,
Nov. 26. Toronto, Canada.

A. J. MORSE & SON.
DIVING APPARATUS

140 CONGRESS ST. BOSTON.

66 x 10½ Steamboat For Sale.

Fitted with 6-12 x 6 fore-and-aft compound condensing engine and Roberts boiler.

Upper works to suit.

Marine Iron Works,
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Chicago, U.S.A.

Nov. 12

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Lake steamer and tow for sale. Total tonnage 1,000. Equipment complete. A-1 condition. Address, G. M., care Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O. Nov. 12

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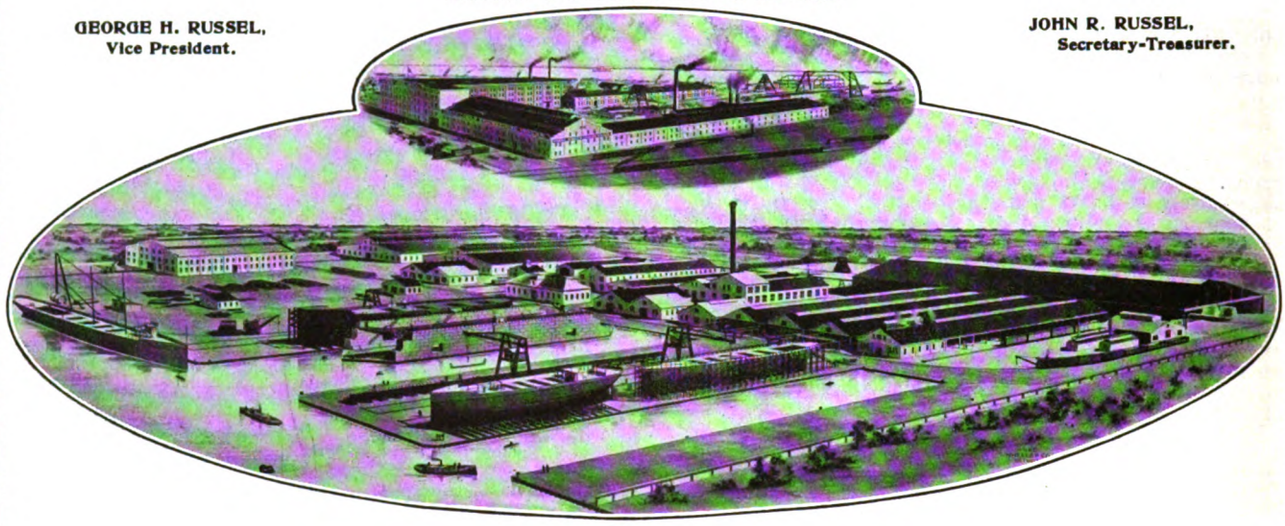

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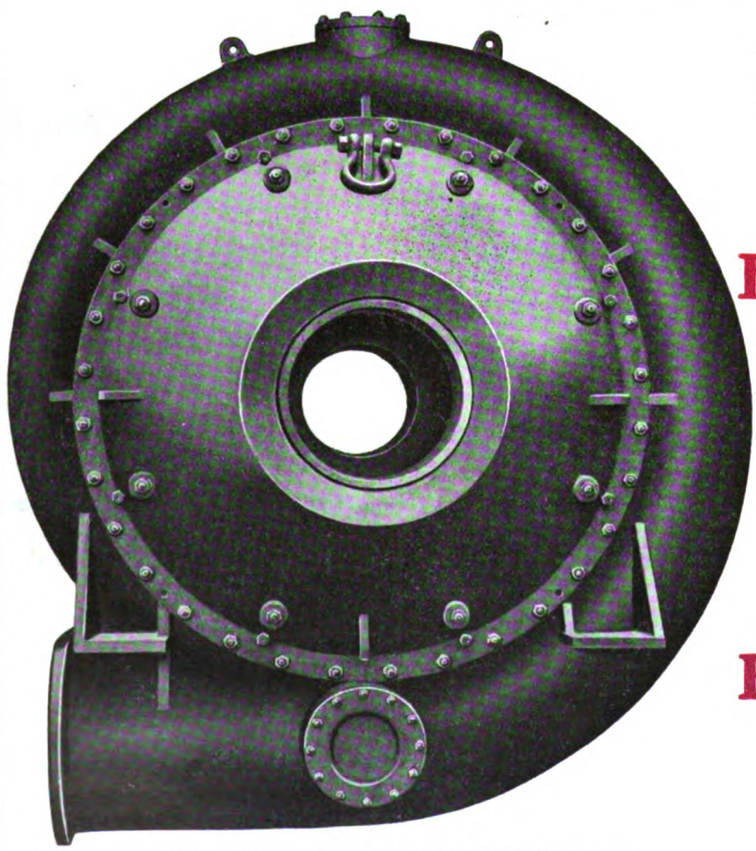

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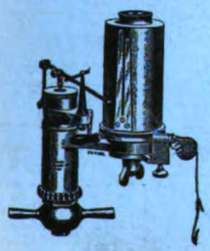

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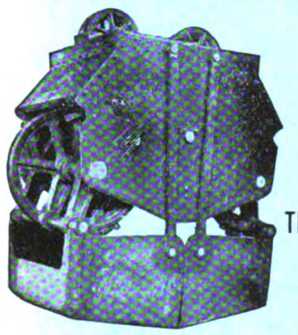

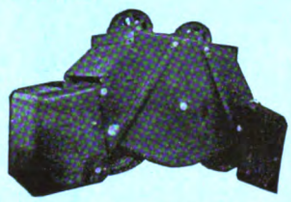

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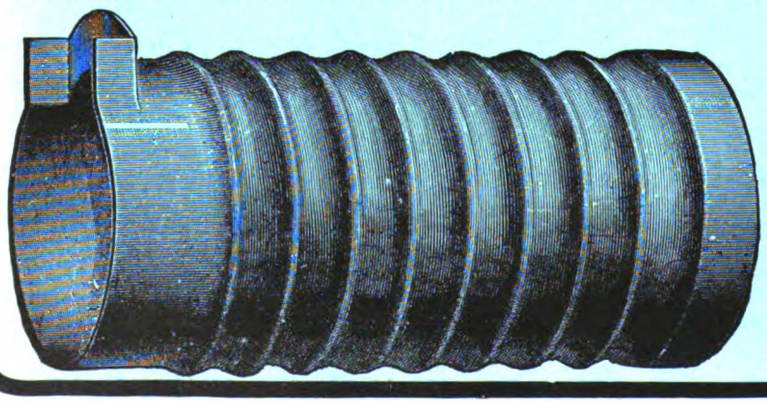

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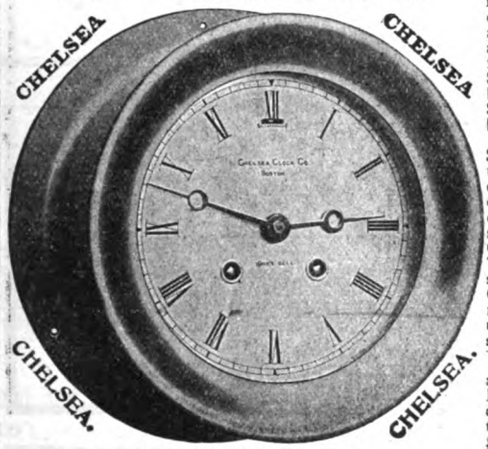

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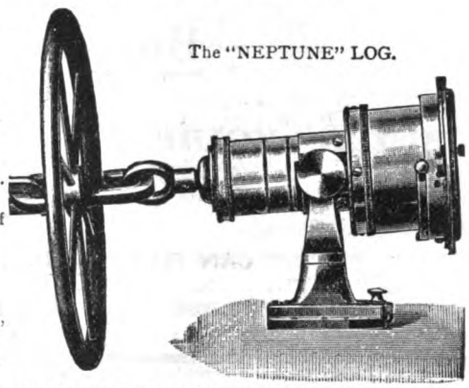

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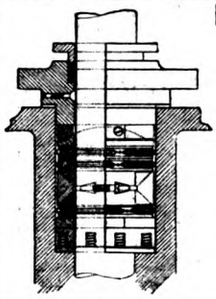

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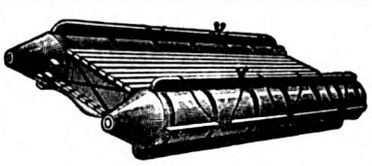

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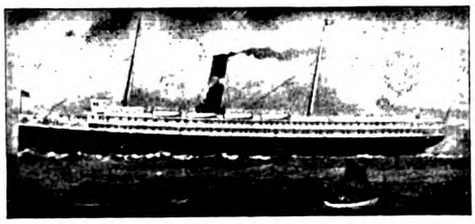

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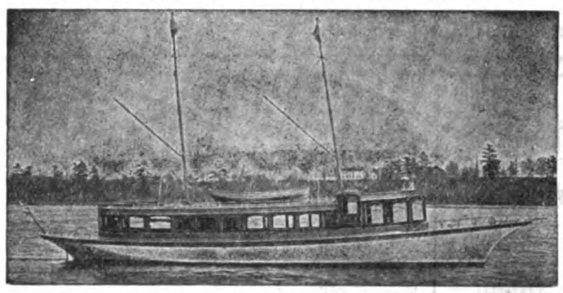

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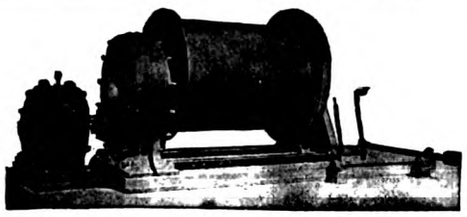

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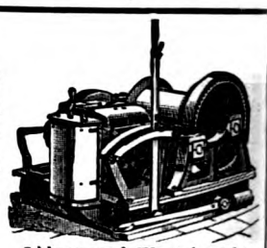

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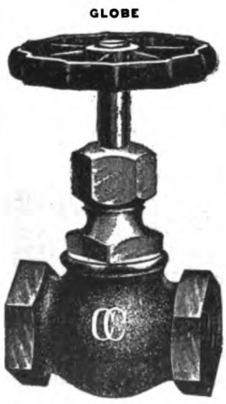

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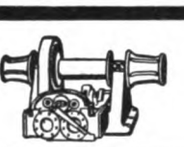

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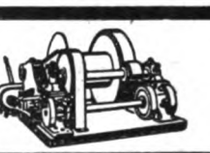

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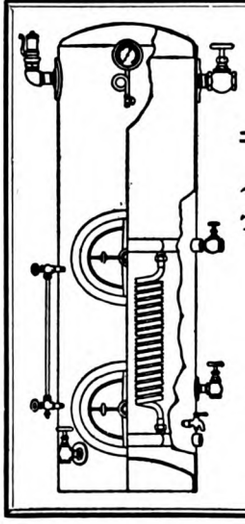

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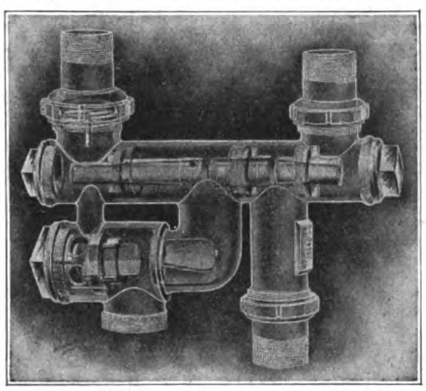

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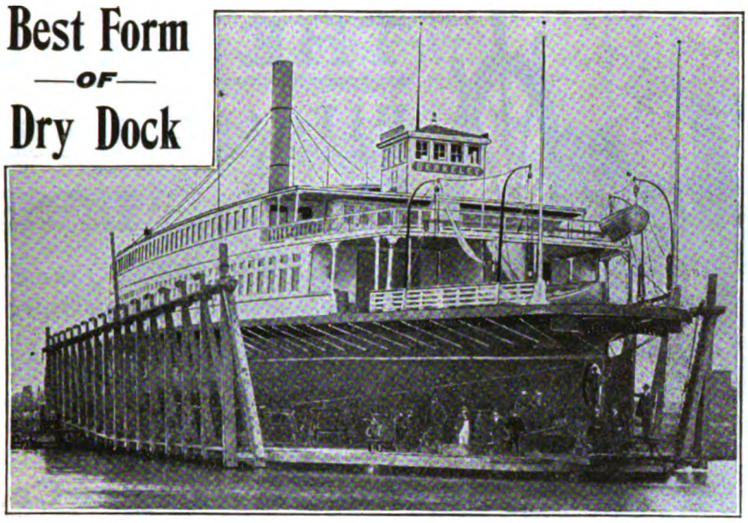

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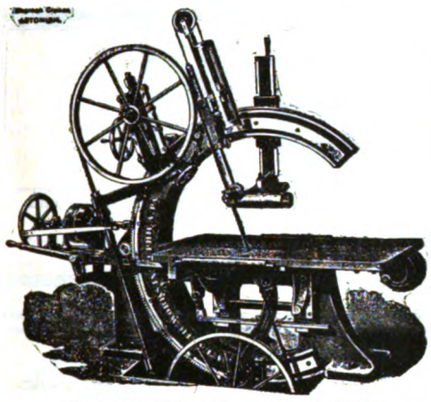

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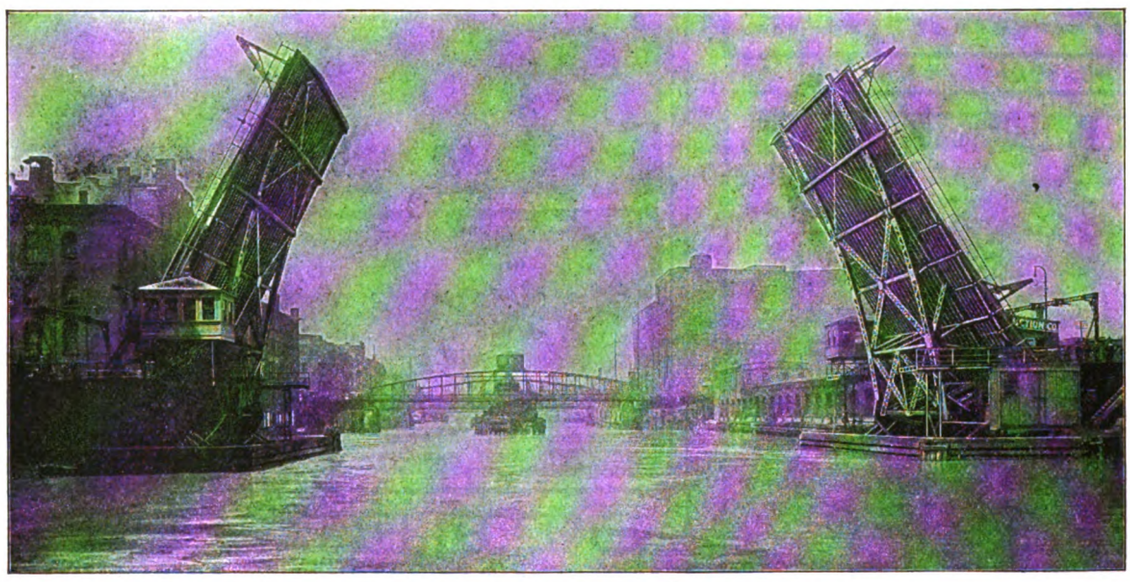

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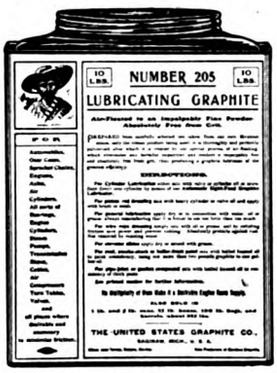

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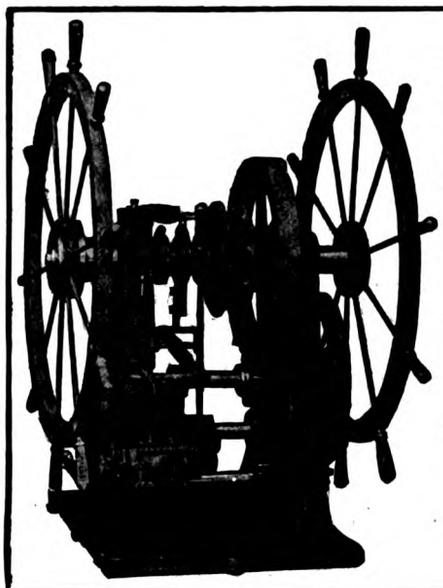

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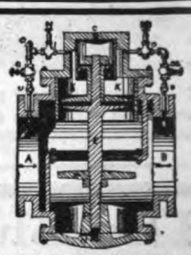

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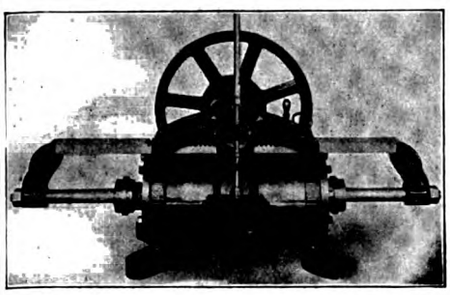

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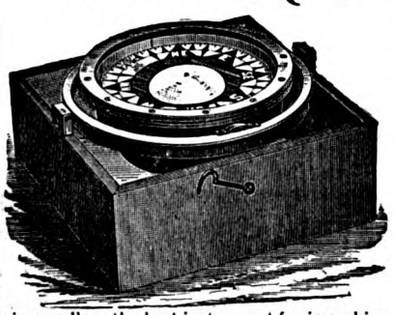

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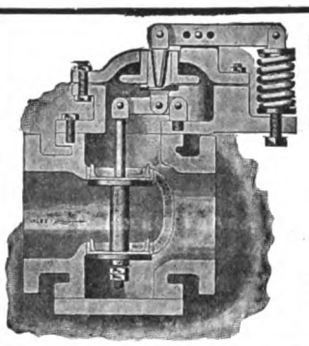

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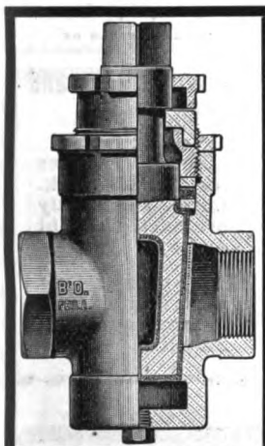

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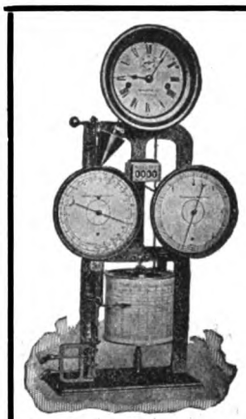

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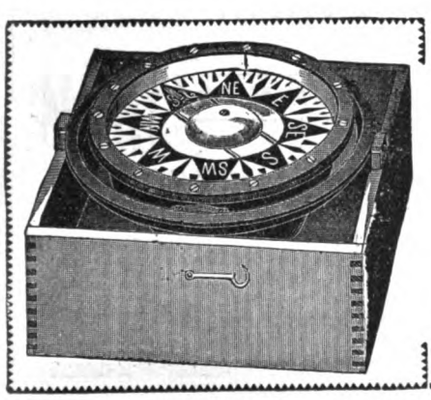

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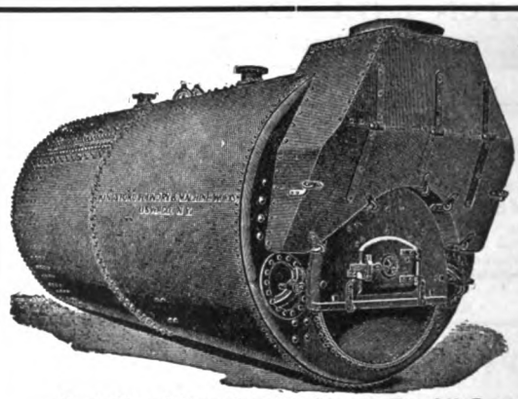

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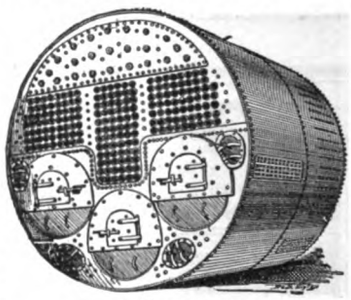

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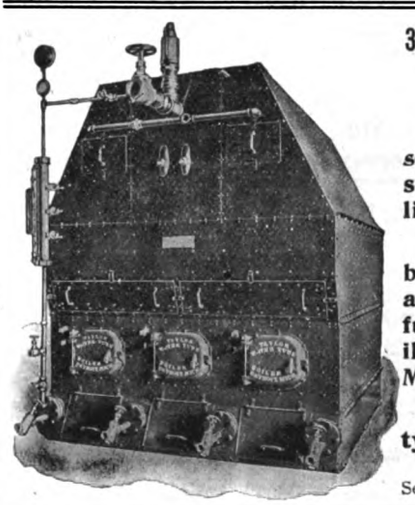

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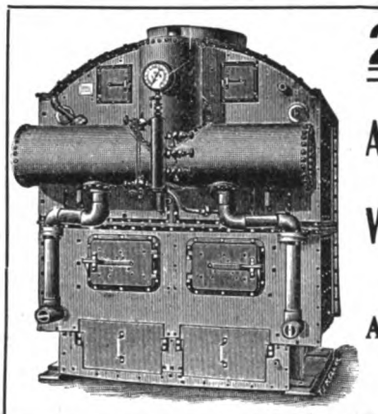

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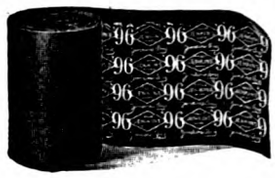

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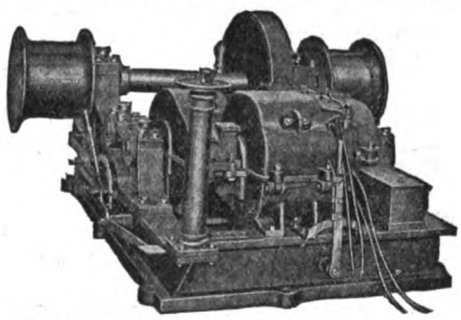

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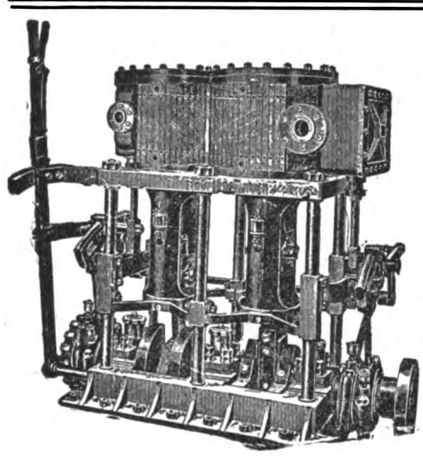

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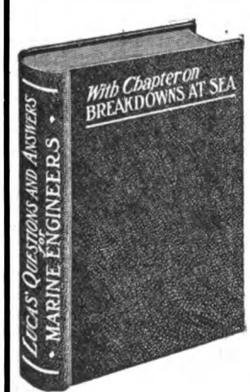

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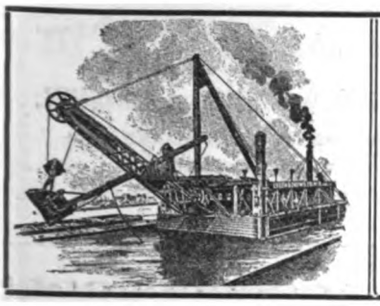

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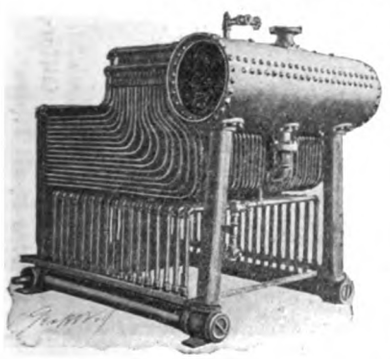

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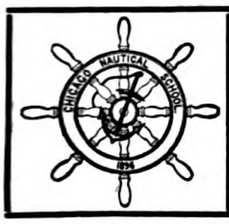

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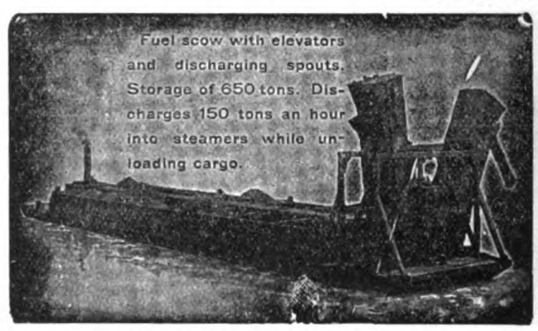
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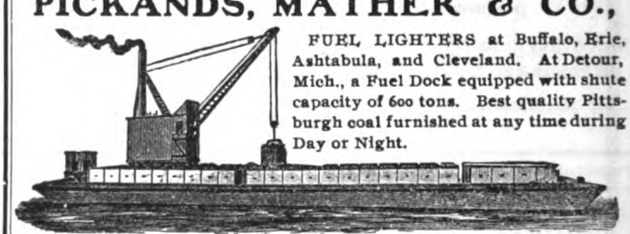
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Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co. .....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOOKS, NAUTICAL AND ENGINEERING.

Audel & Co., Theo.....New York.
Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Wellman-Seaver-Morgan Co. .....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co. .....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co. .....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM.

With Steam Heating Attachment.

Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Maine), CHRONOMETERS, BELLS.

Ashton Valve Co.....Boston.
Bliss, John & Co.....New York.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Wellman-Seaver-Morgan Co.....Cleveland.

COMPASSES.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Smith, Capt. W. J. .....Seattle, Wash.

CONDENSERS.

Thropp & Sons Co., John E. .....Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co....Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

COPPER, TIN AND SHEET IRON WORK.

McCutcheon, C. H.....Buffalo.
Rippley Hardware Co.....Grafton, Ill.

CORDAGE

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot .....Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

DISTANCE FINDER.

Nicholson Ship Log Co.....Cleveland, O.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works .....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....New York.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co Newport News, Va.

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Northwestern Steam Boiler & Mfg Co., Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
MacLean Hydraulic Signal Co.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. .....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
McCutcheon, C. H. .....Buffalo.
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co., Duluth, Minn.
Reilly Repair & Supply Co., James....New York.
Rippley Hardware Co .....Grafton, Ill.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Electro-Dynamic Co.....Philadelphia.
Garrett-Cromwell Engineering Co.....Cleveland.
Gaskin, Edward .....Buffalo.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. .....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V.....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo.
Reilly Repair & Supply Co., James....New York.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co.....Quincy, Mass
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co .....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B. & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
United States Graphite Co .....Saginaw, Mich.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works..... Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co. .....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. .....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T. .....Duluth.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ..New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. .....Chicago.

LIFE FLOATS.

Carley Life Float Co. .....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co.....New York
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co .....Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

LOGS.

Bliss, John & Co.....New York.
Nicholson Ship Log Co. .....Cleveland.
Walker & Sons, Thomas .....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..... Jersey City, N. J.
United States Graphite Co .....Saginaw, Mich.

LUBRICATORS.

Crane Co .....Chicago.
Lunkenheimer Co .....Cincinnatti.

LUMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Lockwood Mfg. Co .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Union Machine & Boiler Co. .....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. .....Philadelphia.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. .....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H. .....Baltimore, Md.
Detroit Ship Building Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. .....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School..... Chicago.
Seattle Nautical School..... Seattle, Wash.

NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.
Kidd, Joseph ..... Duluth, Minn.
Logan, Robert ..... Cleveland.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Newman, R. L. ..... New York.
Sadler, Perkins & Field .....New York.
Wood, W. J. .....Chicago.

OAKUM.

DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co. .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B.....Allegheny, Pa.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.
United States Graphite Co.....Saginaw, Mich.

PACKING.

Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co. .....New York.
United States Metallic Packing Co...Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co. .....Detroit.
Detroit White Lead Works.....Detroit.
Mohawk Paint & Chemical Co.....Norwich, Conn.
New Jersey Zinc Co. ..... New York.
Sipe & Co., James B.....Allegheny, Pa.
United States Graphite Co.....Saginaw, Mich.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PIPE-JOINT COMPOUND.

United States Graphite Co..... Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co. .....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. .....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co..... Cleveland.

PLUMBING, MARINE.

Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son.....New York.

PNEUMATIC TOOLS.

Allen, John F. .....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Phosphor Bronze Smelting Co., Ltd. ..Philadelphia.
Risdon Iron Works.....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Shipbuilding Co .....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co.....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland
Record of American & Foreign Shipping.New York.

RIVETING MACHINES.

Allen, John F.....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS, NAUTICAL.

Chicago Nautical School..... Chicago.
Seattle Nautical School .....Seattle, Wash.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co. .....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
Ronch's Ship Yard .....Chester, Pa.
Shipowners Dry Dock Co. .....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J. .....New York.
Russell & Watson .....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.
Moran Bros. Co.....Seattle, Wash.
Shurick, F. S. ..... New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR, SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. .....New York.
Holmes, Samuel .....New York.
King, Rufus S. .....New York.
McCarthy, T. R. .....Montreal, Can.
Newman, R. L. .....New York.
Weeks, F. H. .....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
Erie & Western Trans. Co. .....Buffalo.
Goodrich Trans. Co. .....Chicago.
International Mercantile Marine Co .. Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co. .....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Moulton Steering Engine Co..... ... New York.
Sheriffs Mfg. Co. .....Milwaukee.

STOCKS, BONDS, SECURITIES.

Fahey & Co. .....Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. .....Boston.
Schrader's Son, A. .....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Matteson & Drake .....Philadelphia.
Newman, R. L. .....New York.
Wood, W. J. .....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. .....Chicago.
Pittsburg Testing Laboratory Ltd. .....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. .....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .....New York.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc. .....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co. .....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Lunkenheimer Co. ..... Cincinnati.
Sturtevant Co., B F, Jamaica Plain. .....Boston.

TRUCKS.

Boston & Lockport Block Co. .....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co. .....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Bordo, L. J. .....Philadelphia.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. ..... Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Detroit Varnish Co..... Detroit.
Detroit White Lead Works..... Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Boland, John J. .....Buffalo.
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No. 44, Ac via Sandusky..	†1:40pm	..
No. 46, Southwestern Ex.	....	*3:00pm
No. 116, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.	†9:10pm	†9.25pm
No. 126, Norwalk Accom.	†7:40am	.....

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No. 15, Bost & Chi Sp....	*3:05am	*3:15am
No. 19, Lake Shore Lim..	*7:05am	*7:15am
No. 23, Western Express.	*10:30am	*10:35am
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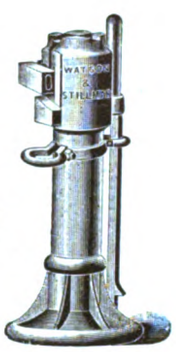

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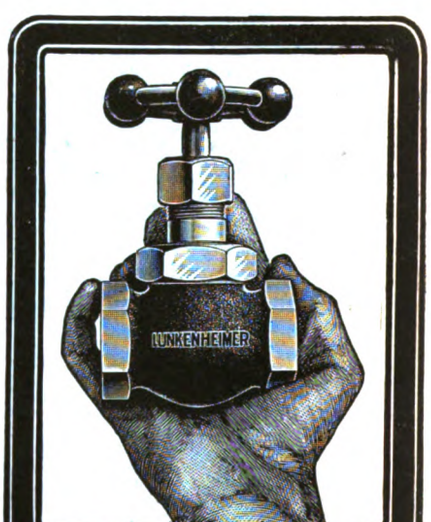

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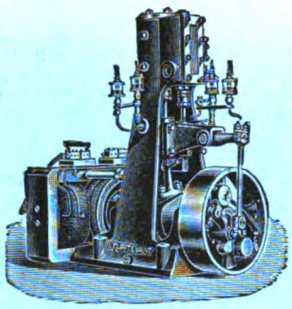

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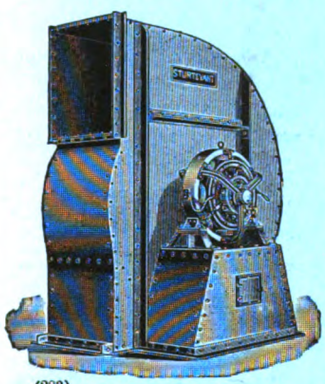

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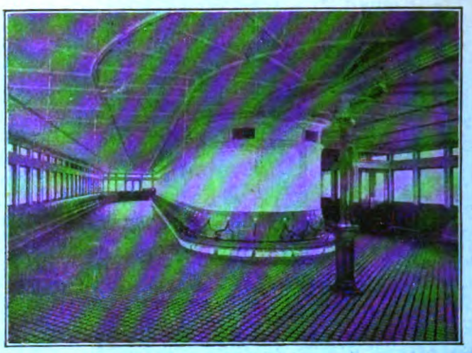

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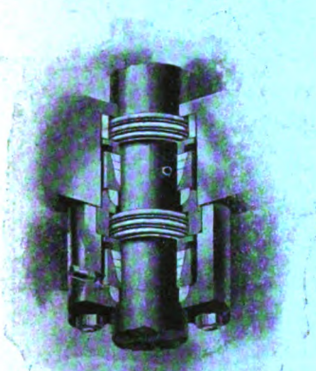

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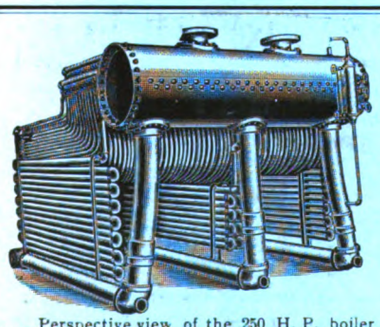

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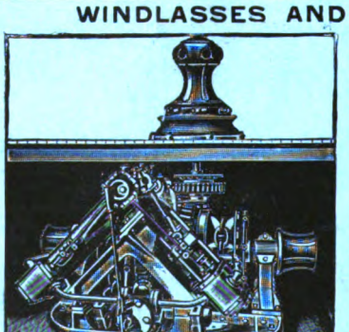

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